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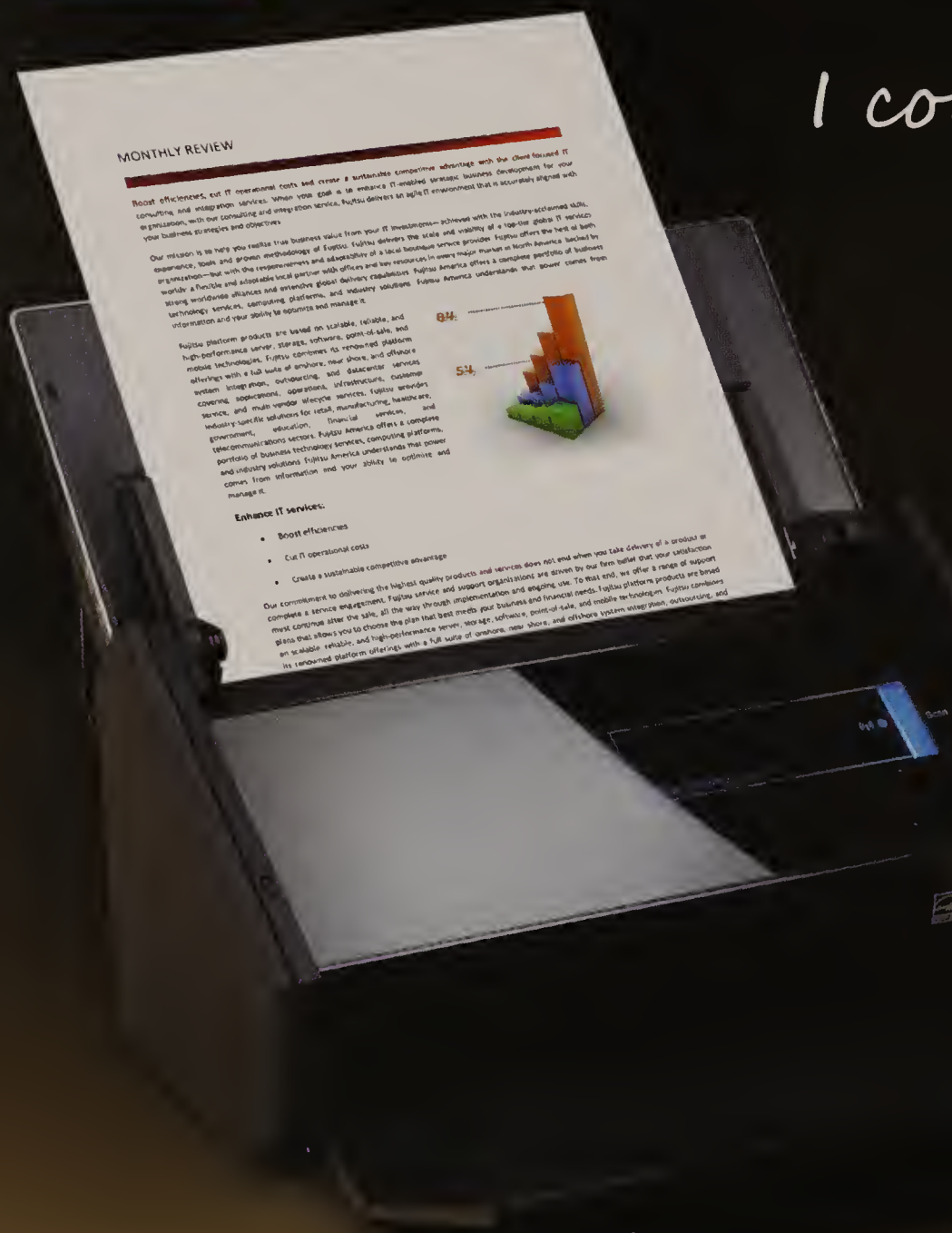
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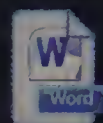
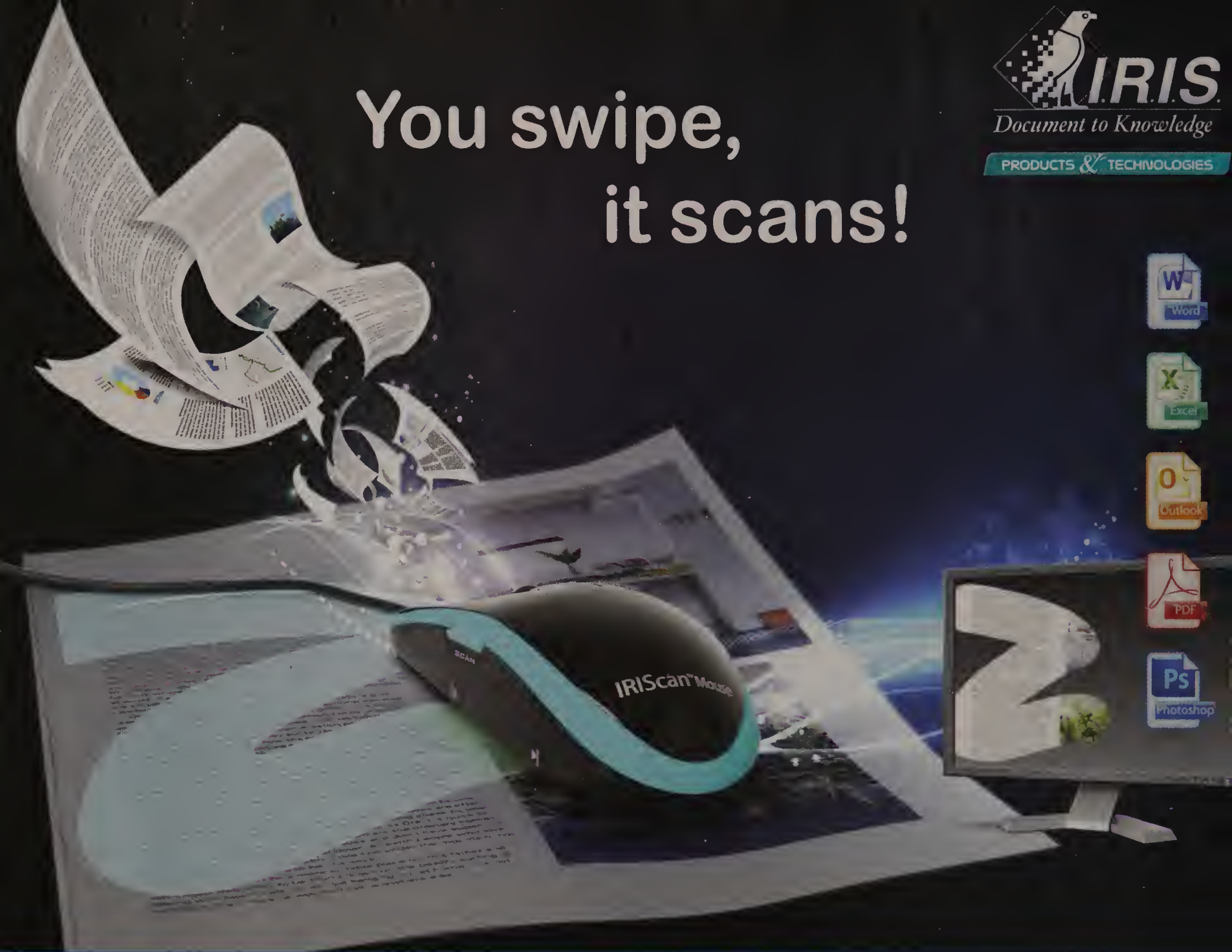
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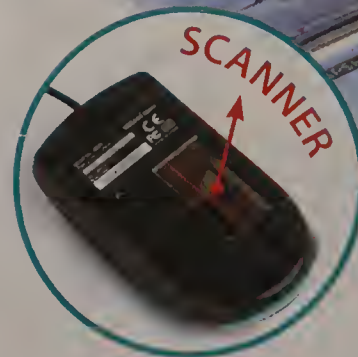
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BRAD CHACOS

Microsoft Needs Rapid-Fire Updates

MICROSOFT IS DITCHING the lethargic release schedule of past years in favor of continuous development. The move to smaller, more rapid updates has gigantic implications for the entire PC ecosystem.

First, more frequent updates should cost less. Rather than dropping \$100 to \$200 on a whole new Windows operating system every three years, you may pay \$30 to \$50 annually for access to the latest tweaks and features.

The change also means more frequent updates to Office and the company's many other apps and services. The steady jog of updates required to keep pace with innovation should yield faster delivery of new features and design tweaks than before—without drastic overhauls that inspire cold-water shock in users of earlier-generation software.

Changes in the Air

Already, recent updates to Windows 8's Mail, Calendar, and People apps have added much-needed functionality to the operating system's core communication software through subtle interface streamlining. An early build of Windows Blue recently leaked to the Web reveals several nifty tweaks to its Live Tiles that improve Windows 8's modern UI.

In the past, big problems with a new version of Windows stayed big until the next version of Windows appeared or a Service Pack was released. The end of those days is a welcome change indeed.

Microsoft wants customers to kick the habit of paying for a one-time perpetual license for software, and to adopt the habit of paying for services yearly. Its stacking of the Office 365 deck over a traditional Office 2013 installation is no

The company's adoption of a continuous development cycle heralds an era of more responsive mainstream computing.

mistake. The company could easily deliver new feature updates to traditional Office 2013—but it won't because it wants you subscribe to Office 365.

Services mean more money over time for Microsoft. They also necessitate frequent updates to provide value over traditional, static-yet-functional options.

The computing world as we know it is constructed atop the OS that Bill Gates built. Microsoft's shift from monolithic updates to a continuous development process signifies a new era for the PC—one that's in tune with the fast-paced, Internet-connected world of today, rather than one beholden to the slower pace



Finally, the move to frequent updates ties into Microsoft's cross-device vision of the future. With the shift to Live Tiles, Microsoft set the stage for a buying cycle for consumers where device begets service begets device begets service.

Tomorrow Starts Today

Microsoft's move to incremental updates and continuous development looks like nothing but a good thing for users, Microsoft, and the entire PC ecosystem.

of physical discs and change-averse corporate upgrade cycles. It's an era built around the Internet of Things rather than staid black boxes.

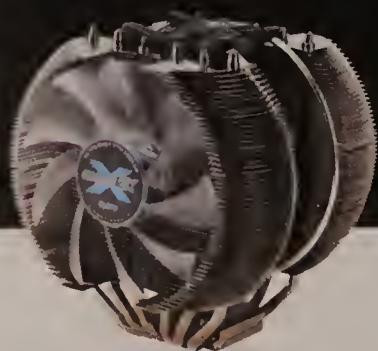
Microsoft's incremental future truly is the future—not the past. And it's about time it arrived. ●

PCWorld Senior Writer Brad Chacos spends his days jamming to Spotify, digging through desktop PCs, and covering everything from BYOD tablets to DIY Tesla coils.



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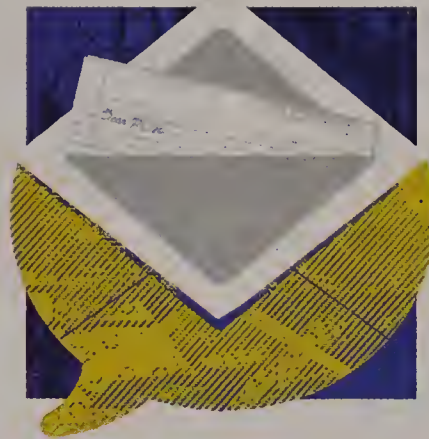
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An April *Forward* story on the recent surge in new Chromebook portables prompted some strong responses debating the pros and cons of these basic, low-cost laptops that depend on an Internet connection. Readers also weighed in on SSDs, recording calls on smartphones, and more.



Chromebooks: Just a Fad?

Regarding "What's With All the Chromebooks?" [*Forward*, April]: The benefit of a Chromebook is price and availability and therefore uptime. If it's lost, smashed, or stolen, I just walk into a store to buy a new one, log in, and I am back at 100 percent functionality. And I can replace my Chromebook four times for the price of one MacBook Air.

Juliusb, PCWorld.com forums

Netbooks [as opposed to Chromebooks] have fantastic battery life. They have 250GB of SSD storage, lots of ports and card slots, and the ability to connect to an infinite number of devices using Bluetooth or USB. And netbooks cost *less* than Chromebooks! Every Chromebook sold is a monument to the cluelessness of the purchaser.

jwchenard, PCWorld.com forums

Blame the "dummification" of computers on Google and Apple. Instead of advancing as processors become more

powerful and cheaper, they're going in the other direction. I, for one, am not going to follow this fad.

JAG2012, PCWorld.com forums

SSDs, Pro and Con

Regarding April's "Screaming-Fast Solid-State Drives": I am always upgrading my computer to be faster and more modern. I have been looking for an article just like this, where I can see the performance I can gain and how to get it. The explanation of the interface is gold. [SSDs] will be my next upgrade to all of my home computers.

Jazzy007, PCWorld.com forums

If you really want to keep your data safe, think twice about SSDs. I'm currently on my third SSD on my laptop. In 20 years of using PCs, I have never had a "conventional" drive fail so that I lose data. Each

time an SSD failed, it was with no warning, and no recovery. The drives that failed are relatively small, so they probably had a lot of write/rewrite action going on, and that killed them. If you really must go SSD, get a big one so the wear is spread out.

Bob Dickinson, The Villages, Florida

Zombie Accounts

Regarding "Prevent 'Zombie Accounts' From Haunting You" [*Security Alert*, April]: One problem is the proliferation of "registration sites." To register a purchase, you have to register at the company's site. You must provide a user ID, a password, and personal information. You can't delete the account and often have no way to change the password. We should be able to register a product with just a serial number and an email address. I

applaud sites, such as Zappos and Amazon, that allow you to order without creating an account.

terp66,

PCWorld.com forums

Amen to using a password manager [for zombie accounts]. I've used Roboform for years, and it is the single best program I own.

scott46ac

PCWorld.com forums

Defragging

In April's "12 Must-Do PC Tasks," in the sidebar titled "Should You Defrag Your Drives?" you say

"Defragmenting...greatly speed[s] up access times—it's one of the all-time great computer tips."

No it doesn't, and no it isn't, for any computer that is less than 25 years old. I refer you to an article printed in a previous issue of your own magazine (go.pcworld.com/defrag).

David H. Copp, Los Altos, California

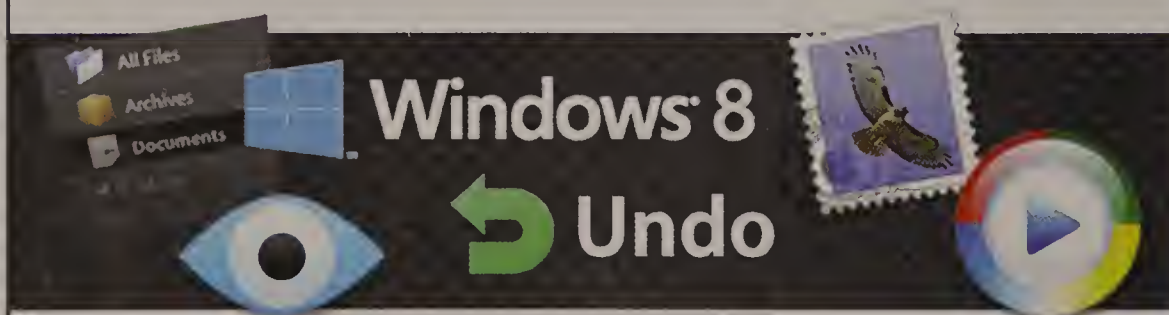
Editor's reply: David, you are



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absolutely correct. Defragging modern hard drives doesn't have nearly as noticeable an effect on performance as it did on the hard drives of yesteryear. Defragging is still far from useless, however—it's a lot easier to recover data from a recently defragged drive if a storage disaster strikes. —*Brad Chacos*

Recording Calls

An addition to April's "Record Calls on Your Smartphone" [*Simply Business*]: If you're an Android user, check out the free app Record My Call. It records inbound and outbound calls, automatically!

dbagdari, PCWorld.com forums

Windows 8—Not for Business?

Regarding April's *Net Work* [*Business Center*]: The biggest reason not to move to Windows 8 is that installing apps must be via the store after Microsoft has reviewed the apps, as opposed to the current open system. If we support this, the limits for business are huge. Could you imagine if your line of business systems required a critical upgrade but you had to wait a week or two while it was reviewed and approved? It makes absolutely no sense for any business to invest in Windows 8.

csmith, PCWorld.com forums

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CORRECTION

THE CHART FOR April's "Office in a Box or Office in the Cloud" [*Forward*] should have said that a subscription for either Office 365 Home Premium or Office 365 University includes 20GB of SkyDrive storage (the correct figure is in the article text). PCWorld regrets the error.

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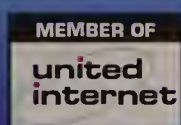
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Forward



High-Tech Ride Sharing Stirs Debate

BY CAITLIN MCGARRY

THE EMERGENCE OF downloadable mobile apps to deliver a cab, luxury car, or shared ride to you seemed to happen overnight. But in reality, the process of developing the services, recruiting drivers, building a following, and expanding into new cities has taken at least a year.

Uber, one of the first taxi apps on the market, launched in San Francisco in 2010 on

Phone-based apps for hailing cabs, reserving private cars, and sharing rides collide with traditional transportation providers.

iOS and Android. Originally it connected passengers with the drivers of already licensed private high-end sedans and SUVs (most of them black).

High-End Rides

The core service is still Uber Black, but the company has added UberX (normal cars at lower rates), Uber SUV (on the

higher end), and Uber Taxi (an e-hail dispatch service).

Uber Black typically costs more than a taxi, but the company says its high-end cars and reliable service are worth the additional expense.

Uber's service quickly drew fans, investors, and protesters, the last of whom claimed that Uber was violating state

and city laws by acting as a cab company despite lacking a license and insurance.

Like its ride-sharing counterparts Lyft and SideCar, Uber says it isn't providing transportation services, but merely serving as a platform for people to find rides. Passengers don't pay drivers directly; they link their credit-card information to the app and then pay with the press of a button when the ride ends.

Last fall, the California »

Public Utilities Commission fined each service \$20,000 for operating without permits. But after months of negotiation, the CPUC rescinded its decision, making ride sharing legal in California.

Complaints about the startups continue, however, particularly from cab drivers who claim that the apps constitute unfair competition. San Francisco's Municipal Transportation Agency responded by approving a plan to develop a taxi-dispatch app so that people can hail cabs from their smartphones.

Out of the West

In February, SideCar selected Austin, Texas, as its next market after building a customer base on the West Coast, and planned a major promotional effort to coincide with the



Lyft cars are recognizable anywhere, thanks to their sporty, Pepto-Bismol pink mustaches.

South by Southwest festivals.

The city of Austin had other plans. After the city passed an ordinance that would have impounded vehicles suspected of offering rides for hire, SideCar gave festival attendees free rides and paid its drivers as brand ambassadors. Then the company sued the

city. SideCar remains in talks with Austin to resolve the situation.

The key issue in all such cases is the definition of transportation service. Taxi-dispatch and black-car apps let you hail a car and typically set a base rate plus mileage, just as a traditional cab company does.

Ride-sharing apps such as Lyft and SideCar connect ordinary drivers using their own vehicles with people looking for rides. The service is donation-based,

and the apps offer suggested donation amounts. You could pay nothing, but then drivers would give you negative ratings, and no one would offer you a ride again. Still, the tech companies insist that their apps just bring drivers and passengers together.

Ride-sharing apps are 21st-century versions of the ride-share boards that arose decades ago in college student unions. SideCar cofounder Nick Allen says that his company looks at each city's transportation laws before expanding. But because few cities have rules governing transportation apps, SideCar and its cohorts have ventured into unsettled legal territory.

Full Speed Ahead

Nevertheless, the rate of expansion isn't slowing down.

Lyft, which debuted in San Francisco last summer and is best known for its fuchsia fender 'staches, added service to Los Angeles in January and Seattle in April. Uber has expanded into more than 30 cities around the world,

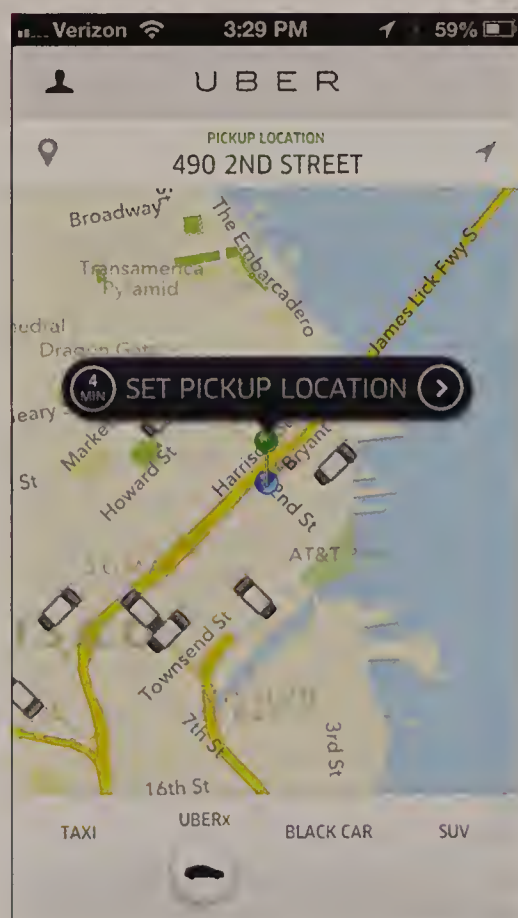
including Paris and Berlin.

Though the apps target major metropolitan areas for the time being, both SideCar and Lyft plan to roll out to smaller cities as part of their long-term expansion plans.

Lyft cofounder John Zimmer says that the startup will find its footing in densely populated metro areas with especially large numbers of early tech adopters, but that the plan is to go mainstream and expand its core demographic. Expansion will be more difficult in areas where car ownership is the norm, SideCar's Allen says, but SideCar is seeing success in Los Angeles.

Of course, most transportation apps have the same plan. Will the arena eventually get too cluttered with too many apps trying to disrupt the system? Zimmer says each app is just another option.

Also look for such apps to get more social. Both SideCar's Allen and Lyft's Zimmer hinted at adding more social features to their apps down the line to foster friendships between drivers and riders.



Uber's app lets you set a pickup location.

Yahoo Mail Introduces Dropbox Support

ATTACHING LARGE files to email messages used to be a major hassle, but email providers are tapping into cloud storage services to simplify it.

Yahoo Mail is the latest service to get in on the action with Dropbox support. Yahoo Mail users can now add files directly from Dropbox, allowing attachments to exceed Yahoo's 25MB size limit. Users can save attachments directly to their Dropbox accounts, too—a handy option if you're using a public computer.

Choice Options

The built-in Dropbox file chooser has a couple of other useful features: It includes a quick link to the Photos folder, as well as a search option. Users can upload files to Dropbox without having to leave Yahoo Mail first.

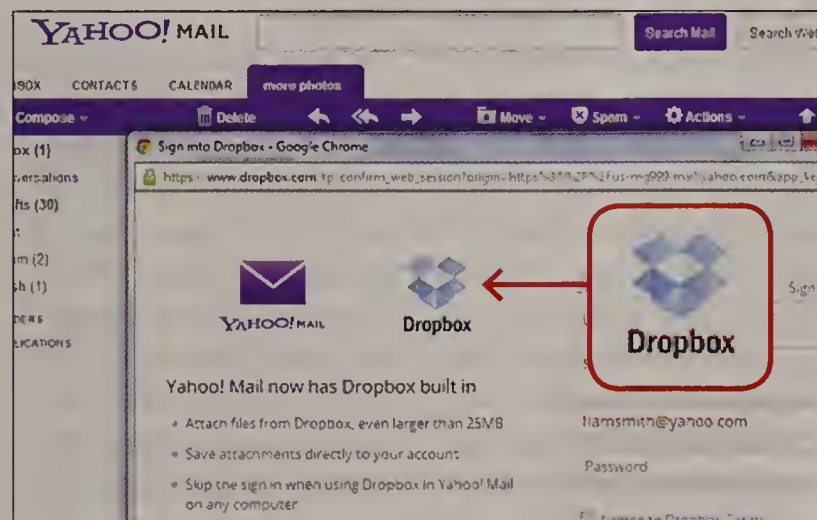
Yahoo Mail isn't the first service to integrate cloud storage. Gmail now permits attachments directly from Google Drive, and Microsoft's

Outlook automatically uses SkyDrive to attach large files and Office documents. (This function is enabled by default, but you can adjust it by going to *Settings* ▶ *Attachments*.)

In practice, these features aren't much different from uploading a file to cloud storage and then sharing the link in the body of an email message, but it does save a couple of extra steps—as long as you already use the particular cloud-storage service that your email provider supports. It's unlikely that Gmail will integrate SkyDrive, or that Outlook will integrate Google Drive anytime soon.

Meanwhile, Dropbox has shown an interest in email lately. In March, the company acquired Mailbox, a much-ballyhooed iOS app that aims to make email management easier. Dropbox has vowed to keep building the app, and eventual cloud-storage integration seems a given.

—Jared Newman



Yahoo Mail offers the ability to add files directly from Dropbox.

BRIEFS

Firefox 20 for Android Bolsters User Privacy

The new Firefox 20 for Android supports private browsing on a per-tab basis, Mozilla says, enabling users to open a new private-browsing tab during their current browsing session and to switch between private and standard tabs within the same browsing session. Also new in the open-source mobile browser is a way to customize shortcuts on the home screen that link to the user's most frequently visited sites.

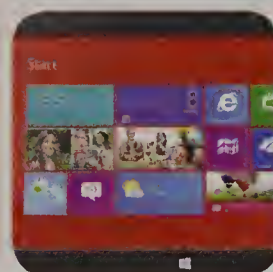


Adults May Text While Driving More Than Teens

A pair of new surveys, funded by AT&T, found that nearly half of commuters admit to texting or sending email while driving, versus 43 percent of teens surveyed. Since 60 percent of respondents said that they never sent text messages from behind the wheel three years ago, the survey results suggest that the dangerous habit may be growing more common.

Samsung Smartwatch Is in the Works

Samsung has confirmed that it is preparing a connected wristwatch, probably under the Galaxy brand. Rumored features include a clock, a music player, maps, and an email client. The device seems to run on a customized version of Android, as all other mobile products in the Samsung Galaxy line do.



Prices of Windows RT Tablets Drop

Windows RT device prices have started falling, signaling a move by PC makers to clear out stock after poor adoption of tablets and convertibles with the OS.

Microsoft released Windows RT for ARM-based devices and Windows 8 for Intel-based devices in October of last year. The price drop is an acknowledgment by the market that Windows RT has failed, analysts say.

Change Paves Way for Smaller Windows Tablets

MICROSOFT HAS altered its hardware certification program to lower the minimum allowable screen resolution for Windows 8 tablets from 1366 by 768 pixels to 1024 by 768 pixels. The change opens the door to officially approved Windows 8 tablets with displays smaller than 10 inches. But inviting resolutions lower than 1366 by 768 is only one issue Microsoft must address before 7-inch Windows 8 tablets become a reality.

Adverse Side Effects

Lowering the minimum resolution might kill Snap, a dual-pane feature of Windows 8 that allows you to display two



Windows 8 tablets may challenge Google's 1280-by-800 Nexus 7.

modern UI apps (or one modern UI app and the traditional desktop) side by side. In current Windows 8 builds, Snap, which requires a minimum screen resolution of 1366 by 768, offers the only way to view two full-screen, modern

UI apps simultaneously; and the ability to multitask well would be a key differentiator between 7-inch Windows 8 tablets and their Android- and Apple-powered rivals.

However, a recently leaked build of the Windows Blue up-

date to Windows 8 shows the Snap feature working at a resolution of 1024 by 768.

Whether they are powered by Windows 8 or by an overhauled Windows RT, a flotilla of 7-inch Windows tablets would align the platform with the desires of modern-day mobile users. Smaller tablets might also help Microsoft overcome the indifference its slates have been met with—in 2012, just 4.7 percent of tablets shipped were Windows 8 or RT tablets, research firm IDC says—but widespread consumer acceptance of pint-size Windows tablets will occur only if the price is right.

—Ian Paul

TECH SPOTLIGHT: RUGGED GADGETS



OLYMPUS TOUGH TG-830 iHS

Olympus's \$279 Tough TG-830 iHS camera is crushproof (up to 220 pounds), waterproof to 33 feet, shockproof, freezeproof to 14° Fahrenheit, and dust-proof, which makes it a great companion for capturing beach or snow adventures, or recording kids' soccer games. This point-and-shoot takes still images and video simultaneously, and can record HD video. go.pcworld.com/tg830ihs



BLUEANT ENDURE RUGGED BLUETOOTH EARPIECE

According to BlueAnt, its rugged Endure earpiece can deliver clear audio outdoors even when the wind is blowing at up to 25 miles per hour. The \$79 Endure also offers built-in protection against dust and moisture, as well as noise and echo cancellation. The manufacturer designed the earpiece to work problem-free with iPhones and Android smartphones. go.pcworld.com/endure



LACIE XTREMKEY USB 3.0

The XtremKey USB 3.0 is a fast, secure, encrypted, extremely rugged USB 3.0 key with AES 256-bit encryption. It's heat-, cold-, shock-, fire-, water-, drop-, and pressure-resistant. LaCie says that the key can withstand being run over by a 10-ton vehicle, exposed to fire for 30 seconds, and dropped 33 feet. It comes with a three-year warranty and starts at \$85 for the 32GB version (\$140 for 64GB). go.pcworld.com/xtremkey



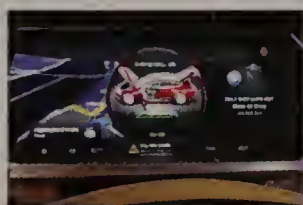
PANASONIC TOUGHPAD FZ-G1

Panasonic's first fully rugged Windows 8 tablet (starts at \$2899) has a raised bezel to protect its 10.1-inch HD LCD screen, which also comes with a replaceable film cover. The 2.5-pound business tablet's magnesium-alloy chassis includes corner guards for protection against falls. You have the option of ordering the FZ-G1 with Windows 7. go.pcworld.com/fzg1

The Techiest Cars of 2013



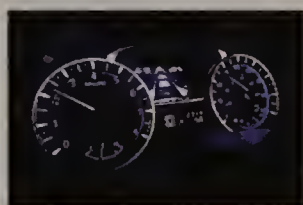
Best overall: Audi A8 Starting at \$72,200, the Audi A8 offers password-protected Wi-Fi for eight devices via the Audi Connect system, and an LTE connection to the Internet. The A8's surprisingly intuitive in-vehicle tech includes voice recognition for spoken commands.



Best all-electric: Tesla Model S A massive, 17-inch central touchscreen in the dash of Tesla's \$57,400 (and up) all-electric Model S allows access to the car's functions and provides a direct connection to the Internet. It supports video display even while the car is in motion.



Best family sedan: Toyota Avalon You can get the 2013 Avalon sedan (\$31,000 base price) with Toyota's Entune suite of on-board apps, a large screen in the dash, and the biggest trunk I've ever seen. One appealing feature is the "eBin"—a smartphone nook with a grippy surface.



Best for mom: Infiniti JX35 The \$41,250 (MSRP) JX35 is an excellent kid carrier, with two independent 7-inch rear-facing screens for entertaining the backseat passengers. The JX35 also offers full control with touch-, voice-, or button-based input to suit different drivers.



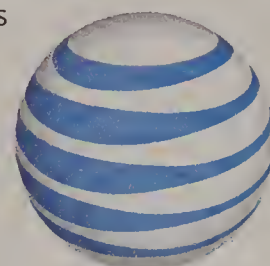
Most controversial: Cadillac ATS The new ATS small sedan (from \$35,225) puts many of the car's basic controls on an LCD touchscreen, frustrating some users accustomed to working with knobs and other physical controls.

—Sarah Jacobsson Purewal

AT&T to Get HD Voice Calling

FOLLOWING THE HIGH-QUALITY voice endeavors of T-Mobile and Sprint, AT&T expects to enable HD voice calls over its 4G LTE network later this year.

HD voice technology has been available in some European markets for several years. It requires phones that support HD voice capabilities, and a compatible network.



HD voice is supposed to provide better call quality at both ends. Also known as *wideband audio*, it packs more frequency data into a call, helping to reduce background noise and promote clearer sound quality overall.

In January, T-Mobile became the first U.S. carrier to announce availability of HD voice calling on its network. Sprint has been testing HD voice calls since last year. Like T-Mobile's, Sprint's feature is limited to calls made within its network.

AT&T's HD voice technology is set to debut sometime this year and will be routed over the carrier's LTE network.

—Daniel Ionescu

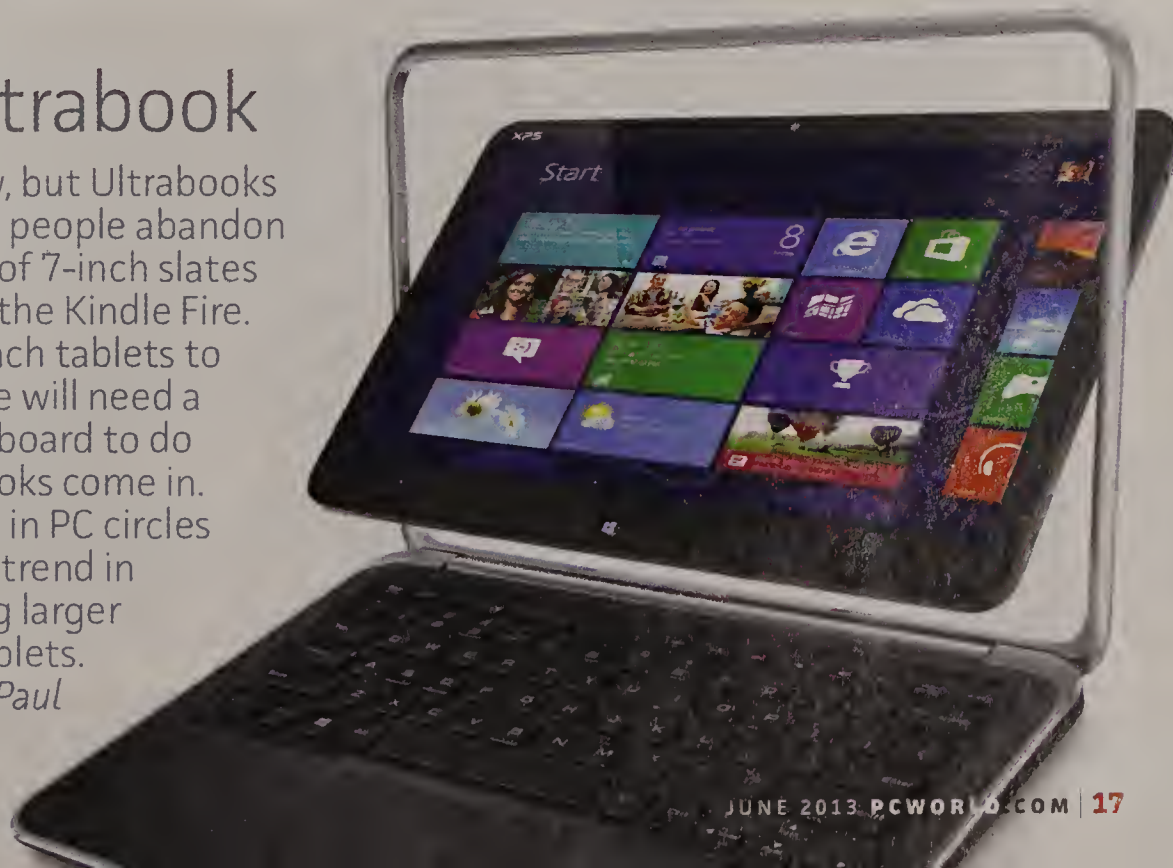
TECH TREND

Large Tablet vs. Ultrabook

Tablets may be killing PCs right now, but Ultrabooks could be poised for a boost as more people abandon their almost-10-inch iPads in favor of 7-inch slates like the iPad Mini, the Nexus 7, and the Kindle Fire.

After making the move from 10-inch tablets to models with smaller screens, people will need a device with a larger display and keyboard to do work on—and that's where Ultrabooks come in. At any rate, it's a popular prediction in PC circles these days, backed by an emerging trend in which manufacturers are eschewing larger slates in favor of pocket-friendly tablets.

—Ian Paul



Google Maps Takes You to the Mountaintop

THE LATEST VISUAL treat for stay-at-home globetrotters from Google Maps is its mountaintop Street Views.

In March, Google released images taken at or near four of the world's highest summits: Everest Base Camp in Nepal, Kilimanjaro in Tanzania, Russia's Mount Elbrus, and Argentina's Aconcagua, enabling armchair travelers to scale those famous peaks while comfortably seated.

Google's team painstakingly documented each ascent, using a tripod and a digital camera with a fish-eye lens and detailing the expedition's ups and downs in a behind-the-scenes blog, Google Lat Long (go.pcworld.com/gll).

Vertical Hold

The blog makes for fascinating reading as you follow along in Google Maps and see the trails that the Googlers climbed to snap the Street

Views. The team spent 12 days getting to Everest alone, slowed in their approach by mudslides and an earthquake.

When they finally reached Everest Base Camp at 18,192 feet above sea level, members of the team didn't pause to take in the view.

Among the other sights they saw while documenting each mountain were huts constructed from Cold War-era fuel barrels on Mount Elbrus, base-camp setups on Aconcagua's Plaza Argentina, and the snowy terrain on Kilimanjaro's highest point, Uhuru, which stands 19,341 feet above sea level.

The expedition group curated a selection of their favorite photos from the treks. You can view them in the Street View Gallery; or if you prefer, you can explore using Google Maps on your desktop or smartphone.

—Caitlin McGarry



A Google Maps image of nearby sky from Argentina's Aconcagua.

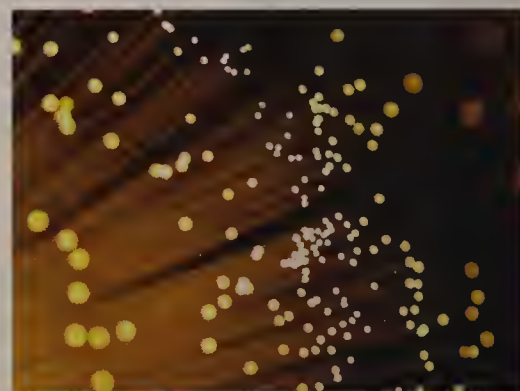
GEEK TECH

Data Does the Time Warp

Scientists use hollowed-out fiber-optic cables to make data travel at near-light speeds.

AS MATTERS STAND now, fiber-optic cables provide the fastest broadband Internet to homes. I should know: I flipped out when a fiber-optic setup increased my regular Internet speeds by a factor of 15.

Now researchers at the University of Southampton in the United Kingdom are pushing the possibilities of fiber even farther—to the near-ridiculous limit of 99.7 percent of the speed of light. And if you think that's fast, wait until you hear that the group's fiber-optic cable can reach data transfer speeds of 10 terabytes per second.



The scientists pulled off this trick by the simple expedient of hollowing out the inside of a regular fiber-optic cable and filling it with air.

Fiber-optic cables transfer light faster when hollowed out.

Hollow but Not Empty

Scientists already knew that air-filled fiber cables can increase the speed of data transmission via light, but previous attempts to harness the phenomenon always resulted in data loss whenever the cables had to turn a corner. To fix that issue, the researchers improved the design of their hollow fiber tubes, limiting the data loss to an acceptable 3.5 decibels per kilometer.

The researchers say that these speeds wouldn't be possible with a regular fiber-optic cable because silica glass causes light to travel 31 percent slower than the full speed of light in a vacuum (186,282 miles per second or 299,792,458 meters per second).

This all sounds great, but 10-TBps speeds are unlikely to arrive in our homes anytime soon. Instead, these blisteringly fast fiber-optic cables will probably debut in data centers with racks of supercomputers. —Kevin Lee ●

Visit the Geek Tech blog at go.pcworld.com/geektech for hacks, tips, and hardware news.

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Beautiful, fast, fluid



Staff Picks

NEW PRODUCTS THAT HAVE OUR EDITORS DROOLING



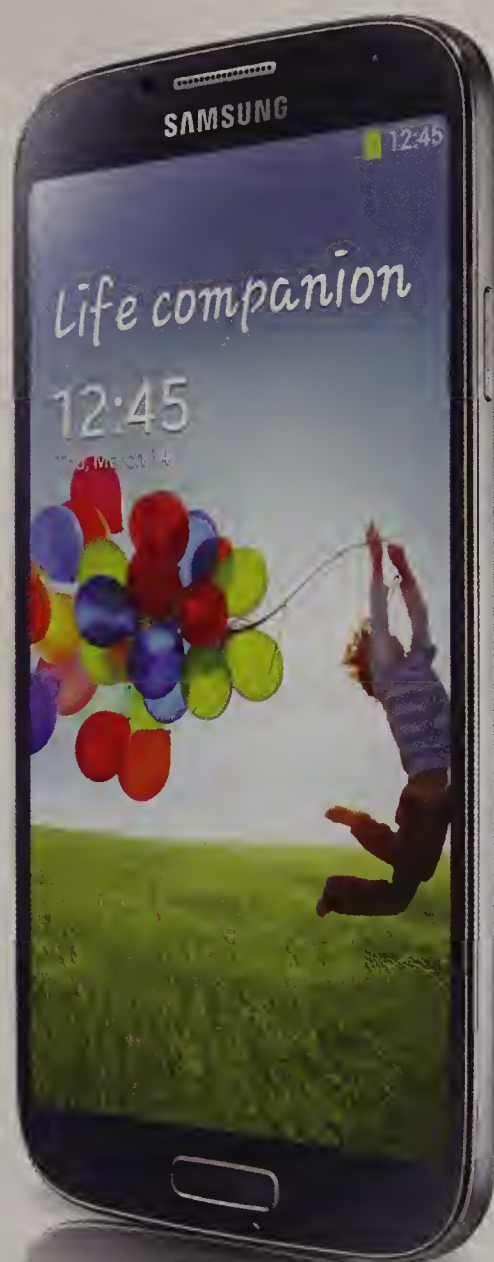
Samson Technologies Zoom Q2HD

You want to produce videos and podcasts, but home studios are expensive. One possible alternative: the \$200 Zoom Q2HD. This small HD video recorder offers mid-side stereo recording, as well as the ability to divide and trim footage right on the device. go.pcworld.com/q2hd



D-Link DGL-5500

The DGL-5500 is a rock-star router. It delivers gigabit AC wireless speeds of up to 1250 mbps and uses Qualcomm StreamBoost technology to allocate ideal bandwidth for uninterrupted gaming. The DGL-5500 debuts later this year; pricing is not yet available. go.pcworld.com/dgl5500



Samsung Galaxy S4

The high-powered Galaxy S4 comes with such sci-fi-like features as Air View (which lets you control the phone without touching it) and Smart Stay (which allows it to detect whether and where you look at its full-HD screen). Bring it and its 13-megapixel camera on! The 16GB version is available at most U.S. carriers for about \$200. go.pcworld.com/galaxys4



HP Officejet Pro 276dw Multifunction Printer

This peppy \$399 inkjet printer competes with similarly priced laser printers, at HP-specified speeds of up to 20 ppm (black) and 14 ppm (color), while using as little as half the energy of a color laser printer. The 276dw also has automatic two-sided printing and scanning, and a 250-sheet paper tray. It can even fax. go.pcworld.com/276dw ●



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Consumer Watch

Take Your Smartphone to Lunch and Let It Pay for You

Restaurants are embracing new technology to help customers order and pay using the latest gadgets and apps.

BY CAITLIN MCGARRY

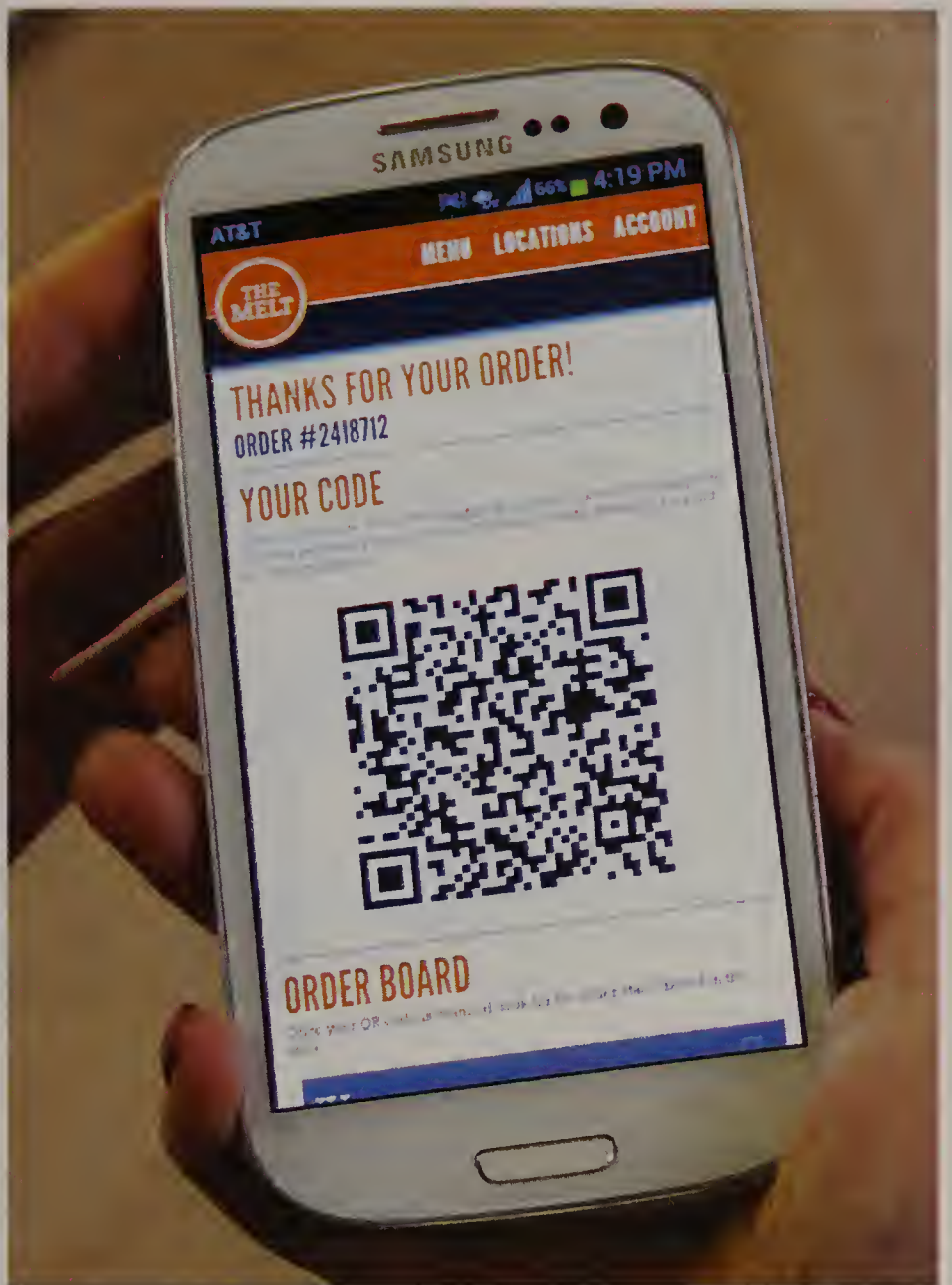
WHEN YOU WALK into The Melt, a San Francisco-based grilled-cheese chain, you head straight for the counter. There's no need to peruse the menu, since you've already placed and paid for your order using the chain's mobile app. An employee scans the Quick Response code on your phone, which contains the details of your order, and within minutes your sandwich is ready to go. No muss, no fuss.

While few restaurants are as automated as The Melt, tech is taking over restaurants and bars across the country. Large restaurant chains are increasingly developing apps, while mom-and-pop shops are embracing mobile payments.

High-Tech Fast Food

You can view The Melt as a pilot program for the future of fast-casual restaurants, which have already perfected the assembly-line process of creating burritos and burgers.

From its CEO—Flip Video founder Jonathan Kaplan—down to its proprietary sandwich-making machines, The Melt, which opened a year and a half ago, is rooted in tech. The chain has expanded to 14 locations in the San Francisco Bay Area and Los Angeles, and plans to have 500 stores nationwide within the next five years. Chief marketing officer and general manager



Paul Coletta says The Melt uses technology to both cook and serve the sandwiches perfectly every time. The sandwich presses combine infrared and radiant heat to produce grilled cheeses within 60 seconds. Customers can place an order through The Melt's mobile site or smartphone app, get a QR code, and scan that at any of The Melt's stores or trucks to pick up the order.

But despite its tech DNA, The Melt doesn't market itself as a high-tech chain, and only about 5 to 10 percent of its orders happen online, Coletta says. However, once the chain starts promoting online ordering and QR codes, as it plans to soon, he expects that number to jump to a quarter of all orders.

Small Steps

Not every restaurant needs complete automation, though. Café Grumpy, a New York-based coffee shop with two outposts in Manhattan and two in Brooklyn, adopted Square's then-beta Register system in 2011. Square was once known as a low-cost way for farmer's market vendors and food trucks to take credit cards. Both the card reader and software are free, and Square >>

takes a 2.75 percent cut from each purchase, or a monthly payment of \$275.

Café Grumpy owner Caroline Bell wanted to phase out her clunky cash register and free up counter space. She also saw that using Square created more space for her employees and customers to interact. Bell plugged the Square card reader into her tablet, and customers used their fingertips to sign receipts, copies of which were then sent via email or text.

Now regulars have started using Square Wallet, which lets them sync their credit cards to the Square Wallet app. Bell can see on her tablet if a Square Wallet user walks into the café, and they can simply say their name to pay for the order. Bell verifies their ID by checking the photo they've uploaded to the app.

Café Grumpy was one of 20 small businesses to recently win a Square Wallet contest that encouraged customers to use near-field communication payments at their favorite restaurants.

Slow but Steady

Restaurants have been slow to adopt new technology, cautiously waiting to see if people actually want to scan the QR codes, pay with NFC technology, or order food through a smartphone app. But people are interested, according to market research.

An October report from food industry consulting firm Technomic indicated that more than half of the surveyed consumers want restaurants to incorporate new tech, particularly gadgets or apps that make it easier to order or that offer discounts. And as expected, younger diners are the ones most interested in restaurant apps and touchscreen ordering. Tablet menus aren't common yet, but several high-end restaurants have started using them to manage their wine lists, including Lark Creek Steak in San Francisco and Aureole in Las Vegas.

But will we ever reach the point where restaurants get so technical that servers are replaced by robots? That's doubtful.

ON YOUR SIDE

I PURCHASED AN Acer Windows 8 computer from Amazon in December 2012. I couldn't get it to network with my XP and Windows 7 computers, so I called Acer and was referred to "technical help." I was also asked to give my credit card number. But after about an hour of playing around with my computer, the technician said he could not help me. The next day I returned the computer, and Amazon credited my account. However, I was charged \$149.99 for tech support that had done nothing. I called Acer and was told that they had referred me to what I assumed was another Acer department. It wasn't. When I called the tech support number, a supervisor said it was not his company that had charged me, but he would contact the company that did and then authorize a refund. They never called. I called my credit card company, but they couldn't identify the company that had charged me. Help! —James L. Windeck, Scottsdale, Arizona



ANNE KANDRA

OYS responds: We contacted Acer, and a representative said, "Our customer care team investigated the claim and found no record of Windeck calling Acer's technical support. One of our reps contacted him to learn more, including the phone number he used to reach Acer, but he hadn't kept it. What likely transpired is that he called a third-party [company] that provides technical support instead of Acer." She added, "When you do an online search to find technical support, there will be several links with

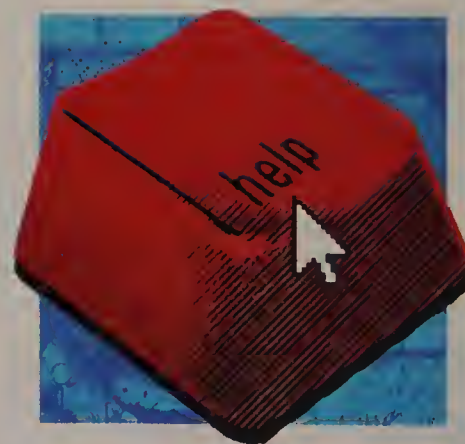
the vendor's name, yet many are third parties [and not] the actual vendor." When you call, note who you're talking to and the call time and date. Don't offer your credit card unless you understand all the terms. As for Windeck's case, his credit card company refunded the charge.

I BOUGHT A Buffalo MediaStation Blu-ray writer in December 2012. When I tried to burn a DVD, it didn't work, so I returned it with my proof of purchase. When I didn't hear back from Buffalo Technologies, I sent an email. They replied stating they had no record of my returning the product. I then sent documents showing the proof of delivery, but their reply was that they could not find it in their system.

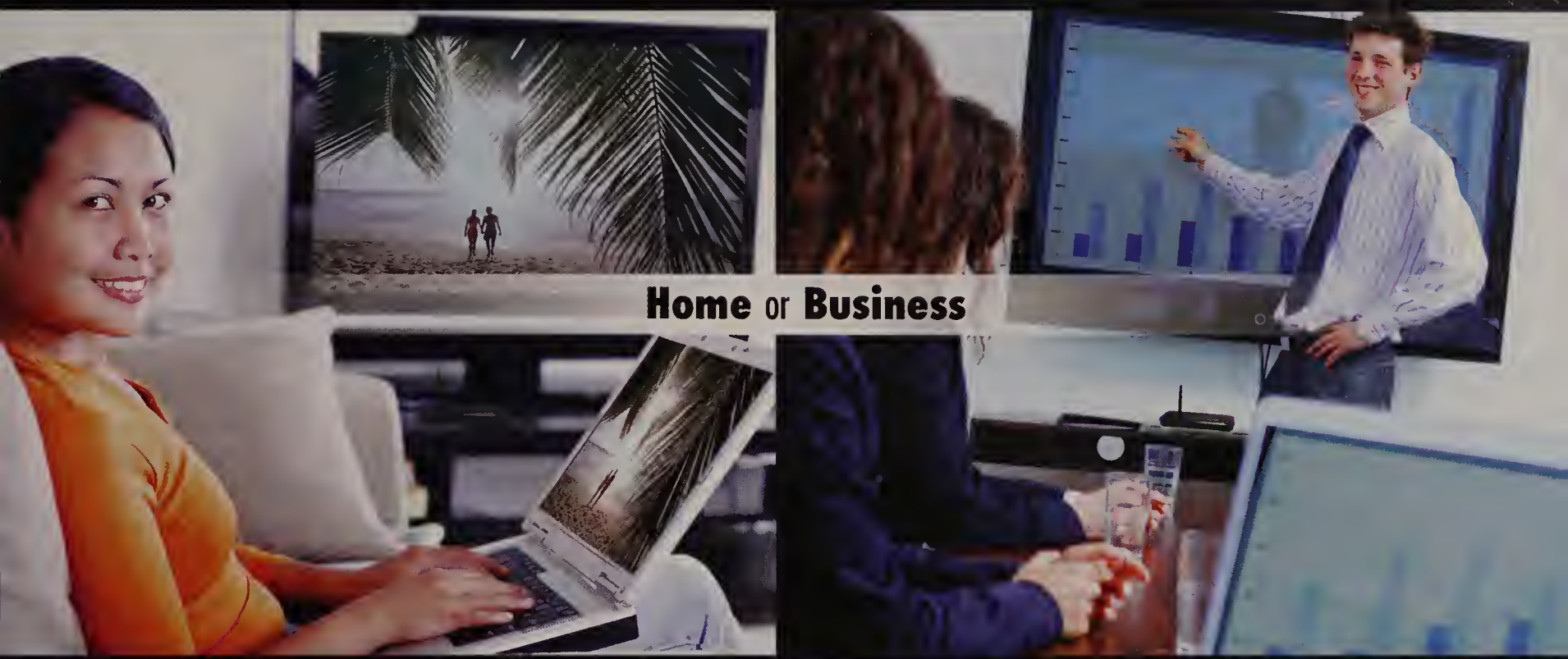
—Jay Dubner, Scarsdale, New York

OYS responds: When we contacted Buffalo Technology, a rep told us that Dubner had sent the device directly to the corporate office with no RMA number. Buffalo has since contacted him to arrange the return transaction. The rep said, "Any customer who would like to return a unit should contact technical support in advance of shipping it, to get the correct process for a return."

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Improve Your Fitness With Help From Your Smartphone

MOST OF US can use a little extra encouragement when it comes to eating right and exercising. But that doesn't mean you have to shell out for a personal trainer or a special diet plan—just grab your smartphone and get active. Hundreds of health and fitness apps are available. Not all of them deliver, however, so you should spend some time trying them out to see which ones best match your goals. Here are a few trusted apps to help you get started.

Fitocracy (free; Android, iOS): This app uses a social game format in which you earn points by being active. Although you can log virtually any exercise or sport, you also get credit for climbing stairs or walking to the deli for lunch. The more active you are, the faster you advance through the fitness levels. You can also link to Facebook, RunKeeper, Tumblr, and Twitter.

Fooducate (free; Android, iOS): If you're trying to eat healthier, it's often hard to find the best food choices. Low fat sounds good, but does that matter if the muffin is loaded with sugar? What about all the preservatives? Fooducate gives you the nutritional lowdown, including a letter grade for a wide variety of foods. Just scan the product's bar code, and if it's in the Fooducate database, you'll see all of its nutritional details, a FoodPoints value (based on fats, carbs, fiber, and protein), a comparison to similar products, and suggestions for healthier alternatives.

My Fitness Pal (free; Android, BlackBerry, iOS): Want a better sense of how many calories you should consume each day? My Fitness Pal helps you set goals and stick to them by analyzing calories consumed and calories burned. Just enter the foods you eat and your activities, and you'll get a report on where you stand in meeting your weight goals. You can save entire meals, obtain nutritional analyses, track exercises, and connect with friends. The app's food database is exhaustive, and it even includes a bar-code scanner to help you find specific items.

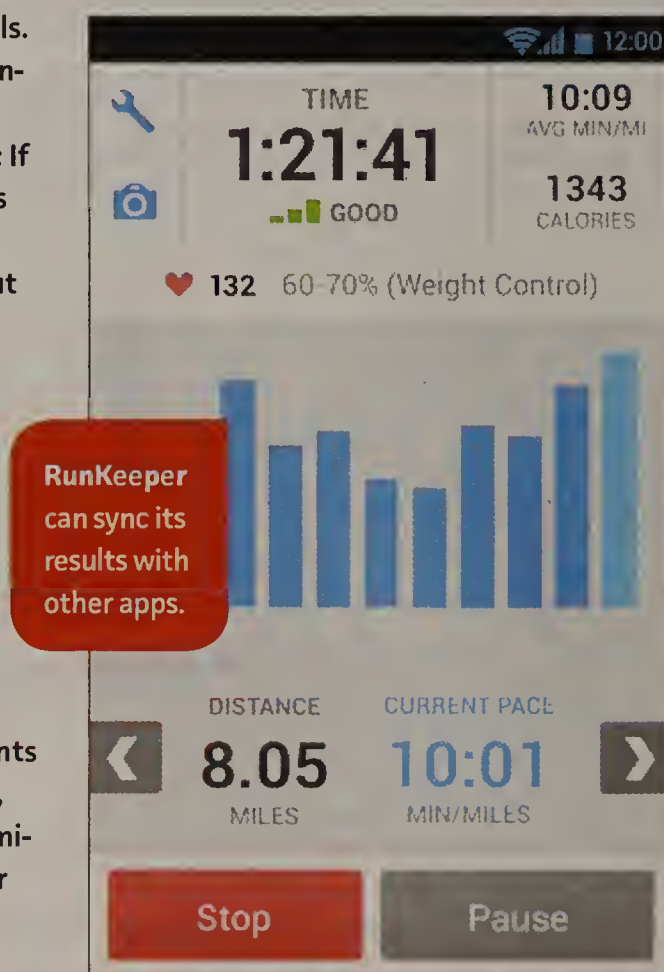
Looking for a way to get into shape without paying for a trainer or a special diet? Download these mobile apps and get fit for free.

Nike Training Club (free; Android, iOS): This app is like your personal fitness trainer. Just choose a goal (Get Lean, Get Toned, Get Strong, or Get Focused), a level (Beginner, Intermediate, or Advanced), and a workout. The workouts range from 15 to 45 minutes in length, and the app clearly explains each activity with text, audio, pictures, and video, as well as tips to keep you motivated. You can use your own music playlists. The app also links to Facebook and Twitter.

RunKeeper (free; Android, iOS): Don't let the name fool you—whether you're into running, swimming, or simply ambling down the street, RunKeeper will track your activity, as long as you're moving. It uses GPS to map your route while measuring stats such as distance, time, and calories burned. You can set goals, use music and audio cues, measure your heart rate, connect with friends, post to Facebook and Twitter, and sync your results with other fitness apps to create an even more complete fitness record.

SworKit (free; Android, iOS): If you're pressed for time and lack equipment, SworKit helps you get creative. Just tell the app what kind of workout you want to do and how much time you have, and you'll get an instant circuit-training workout, complete with images and videos. The app presents exercises in 30-second intervals with built-in rests. You'll also find an "anything goes" option that mixes up target zones and yoga routines.

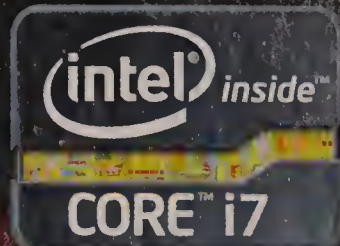
Wherever Workout (free; Android, iOS): This app focuses on small amounts of activity that break up your day. It helps you fit simple restorative movements and stretches into the time you do have, even if you're tied to your desk or sitting on a plane. With about 20 easy routines that range from 4 to 15 minutes, it won't exactly turn you into a world-class athlete, but it offers useful ways to work movement into even the most sedentary lifestyles. —Anne Kandra ●



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Set Up a Safe Virtual Private Network

Installing a good VPN can dramatically improve your online privacy when you work remotely. Here's how to do it right.

BY ERIC GEIER

A VIRTUAL PRIVATE network is a virtual version of a secure, physical network—a web of computers linked to share files and other resources. VPNs connect to the outside world over the Internet, and can secure general Internet traffic and corporate assets across encrypted tunnels for network connections and traffic. For details on selecting a VPN networking protocol, see “How (and Why) to Set Up a VPN Today” at go.pcworld.com/vpns.

Set Up a Simple VPN With Windows

Windows comes with a VPN client that supports two of the most common VPN protocols, PPTP and L2TP/IPsec. The setup process is simple: If you're using Windows 8, just bring up the Search charm, type **VPN**, and then launch the VPN wizard by clicking *Set up a virtual private network (VPN) connection*.

You can use this client to connect securely to other Windows

computers or to other VPN servers that support PPTP or L2TP/IPsec; you just need to provide the IP address or domain name of the VPN server to which you want to connect. If you're linking to a corporate or commercial VPN, ask the administrator for the proper IP address. If you're running your own VPN server via Windows, get the server's IP address by typing **CMD** in the Search charm, launching the Command Prompt, and typing **ipconfig**. This trick comes in handy when you're setting up your Windows PC as a VPN server, and then connecting to it so that you can securely, remotely access your files from anywhere.

When setting up incoming PPTP VPN connections in Windows, you must configure your network router to forward VPN traffic to the Windows PC you want to access remotely. To do this, log in to the router's control panel and configure the port-forwarding or virtual-server settings to forward port 1723 to the IP address of the computer you wish to access. You'll want to enable PPTP or VPN pass-through options in the firewall settings, but usually they're switched on by default.

If you're using Windows 7 and you need to connect to a VPN or to accept incoming VPN connections in that OS, see “How to Set Up VPN in Windows 7” (go.pcworld.com/vpn7). »

Use Third-Party Software to Establish a VPN Server

If you want to create a VPN between multiple computers to share files and network resources without configuring your router or dedicating a PC to act as the VPN server, try third-party VPN software. Comodo Unite (go.pcworld.com/unite), Gbridge (go.pcworld.com/gbridge), and TeamViewer (go.pcworld.com/teamv) are functional, reliable, and free.

Another option is LogMeln Hamachi (go.pcworld.com/hamachi): It's free for five or fewer users; but if you would like to link six or more PCs securely on a VPN, consider paying for the full service.

Create Your Own VPN Router

If you want to get more deeply involved in providing robust remote access to an entire network, or if you wish to create site-to-site connections, set up a router on your network with a VPN server and client. The cheapest way to set up a dedicated VPN router is to upload aftermarket firmware that offers VPN functionality, such as DD-WRT (go.pcworld.com/ddwrt) or Tomato (go.pcworld.com/tomato), to an inexpensive consumer-level router.

You can also buy a specially designed router with a VPN server built in, such as the ZyXel ZyWall 802.11n Wireless Internet Security Gigabit Firewall (USG20W, go.pcworld.com/zywall), Cisco Wireless Network Security Firewall Router (RV220W, go.pcworld.com/rv220w), or Netgear ProSecure UTM Firewall with Wireless N (UTM9S, go.pcworld.com/utm9s).

When you're choosing a VPN router and third-party router firmware, make sure they support the VPN networking protocol your devices need. In addition, check the VPN router to verify how many simultaneous VPN users it supports.

Regardless of how you go about it, start using a VPN today. Doing so takes a bit of work up front, but spending the time to get on a VPN is one of the smartest, simplest steps you can take toward making your online activities more secure.

SIMPLY BUSINESS

Disable Office 2013's Start Screen

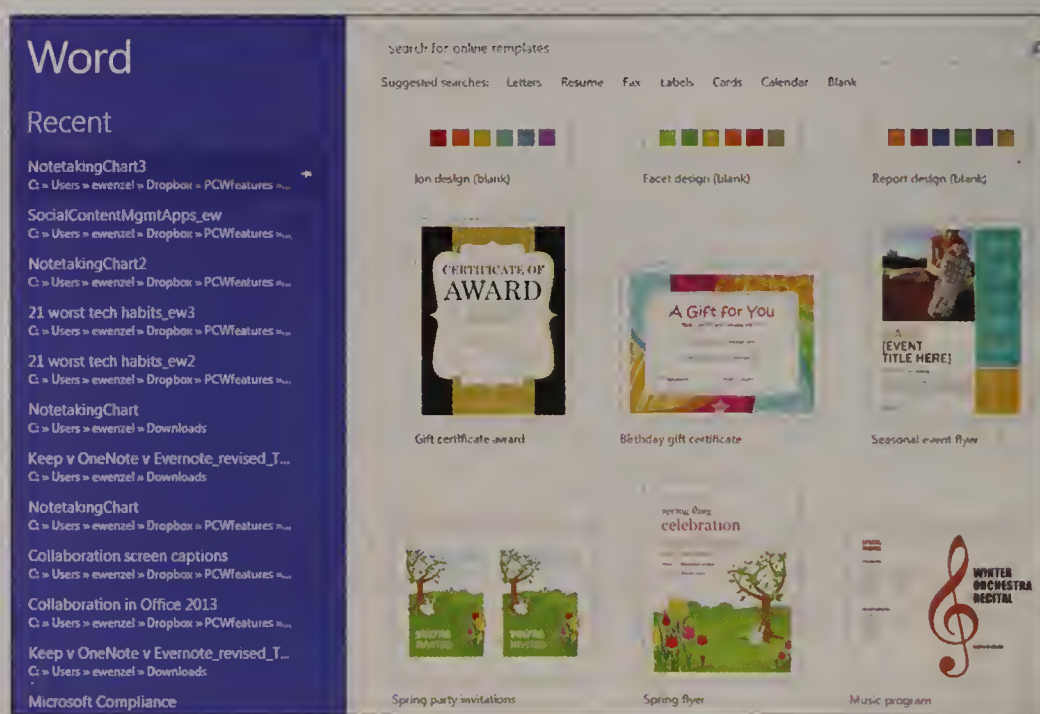


RICK BROIDA

Get straight to work by taking simple steps to bypass the new Word, Excel, and PowerPoint startup windows.

YOU'LL FIND A lot to like about the new Office 2013. Heck, some people might argue that Outlook alone is worth the price of admission.

One thing that bothers me about it, however, is the startup screen that appears when I launch Word, Excel, or PowerPoint. For some users, no doubt, it's a nice addition, providing a quick way to access recent documents or to create a new one using a template—but that's not the way I like to work.



Cut to the Chase

Fortunately, configuring Office to bypass that screen for the aforementioned three programs is a fairly easy task. Here's how to do it, using Word as an example:

1. Run Word. Open an existing document, create a new one, or do whatever else gets you started in Word. The goal is to move past the startup screen.
2. Click **File** ► **Options**.
3. In the General window (which should appear by default), locate the 'Start up options' section. Within that section, uncheck the box labeled *Show the Start screen when this application starts*.
4. Click **OK**.

That's all there is to it. Now just repeat the process in Excel and PowerPoint. The next time you start each of these programs, you'll go straight to the edit screen, just as you used to in previous versions of Office.

Word 2013's startup screen is easy to bypass if you don't like it.



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NET WORK

How Well Does Social Media Advertising Really Work?



CHRISTOPHER NULL

IF YOU ADVERTISE on social media sites, what will your return actually be? To test that question, I set up experimental ads across five services: Facebook, Google AdWords, LinkedIn, StumbleUpon, and Twitter. I wanted to measure how these tools benefited my own content-creation and corporate-blogging

business. For details about the tests I conducted on each service—and my results—see go.pcworld.com/socialads.

The Takeaway From the Tests

The results of this experiment are hardly scientific, given my small budget and the limited amount of time I had to work with. Furthermore, my ads targeted business buyers, not general consumers. A test of ads promoting a hangover remedy product or a novelty wristwatch would probably have yielded very different results. That said, here are some observations based on my experience.

My Facebook ads seemed particularly ineffective at getting clicks: Perhaps users have already grown accustomed to ignoring the ad placements on Facebook due to their predictable location. I recommend experimenting with low CPC (cost-per-click) bids on Facebook when you're getting your feet wet with the service.

LinkedIn was easily the most expensive service to advertise on: In addition, the clickthrough rates on this service were low.

Twitter's almost 1 percent clickthrough rate for my ads was twice that of Google AdWords: That percentage was far and away the best I encountered. Also, charges for advertising on the service are surprisingly low. It's difficult to target your ads effectively on Twitter, but they still appear to be effective despite that limitation. The reason for this discrepancy may be that promoted tweets are virtually impossible for users to ignore.

We placed ads on AdWords, Facebook, Twitter, LinkedIn, and StumbleUpon to find out which social media service provided the best ROI.

StumbleUpon is a great option for extremely inexpensive ads: If you are targeting a broad swath of consumers, this social media option is definitely worth a look.

Maximizing Your Return on Investment

If you're sold on social media advertising, consider these tips.

Start small: Set a very low budget for a CPC ad, and let it run as long as you can to see how it's performing. Tweak the ad frequently and track your results. Some services let you run multiple versions of an ad, so you can compare results.

Clicks aren't everything: Despite getting hundreds of clicks over hundreds of thousands of impressions, my busi-



▲ **StumbleUpon** yielded excellent CPC numbers.

◀ **Facebook** reported just 23 clicks for my ads.

ness didn't net any new clients from these ads. Focus on the actual value of your clicks, and make sure your ROI is positive once you have sufficient history to examine.

Know your target market: My results bore out the adage "Twitter is for business and Facebook is for fun." Think carefully about what social networks your potential customers are likely to use, before charging ahead. ●

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High-performance Back-UPS Pro units deliver cost-cutting, energy-efficient features. Power-saving outlets automatically shut off power to unused devices when your computer and peripherals are turned off or on standby, eliminating costly electricity drains. (BR700G shown above)

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V I D E O G A M E V O T E R S . O R G

Security Alert

Google Chrome: Best Security Tips for Safer Browsing

The browser's security features are good but not perfect. Here's how to work around Chrome's shortcomings and protect yourself from attack.



BY ERIC GEIER

YOU'LL FIND A LOT to like in Google Chrome's security features, including unique sandboxing functions and privilege restrictions. As with all browsers, however, Chrome is imperfect. Here are some steps you can take to enhance its protection.

The most notable Chrome privacy features are its malware- and phishing-protection schemes. Chrome warns you whenever you visit a site that Google has identified as potentially malicious. The browser also corrects misspelled URLs to help you avoid visiting the wrong site—and perhaps a nefarious site—by accident. (Yes, “typosquatting” is still a threat.)

To use these features, open the *Settings* panel, scroll to the *Privacy* section (you may need to click *Show advanced settings*), and check the boxes labeled *Use a web service to help resolve navigation errors* and *Use a web service to help resolve spelling errors*. Be sure to check the *Enable phishing and malware protection* box too.

Click the *Content settings* tab and consider restricting some content, such as JavaScript (which malware often exploits) and plug-ins. Afterward, Chrome will notify you when a site is using those components so that you can opt in for legitimate sites.

Guard Your Passwords and Credit Card Details

If you let Chrome save your website passwords, anyone who uses your PC can access them after a little poking around in the *Settings* panel. Unlike Firefox and its master-password feature,

Chrome—and by extension, third-party add-ons—won't let you encrypt passwords or saved credit card information.

You can, however, do a few things to protect your privacy. First, don't allow people you don't trust to use your Windows user account. Create a Standard account for them or turn on the Guest account. If that's inconvenient, use a Chrome extension such as ChromePW (go.pcworld.com/chromepw), Browser Lock (go.pcworld.com/browlock), or Secure Profile (go.pcworld.com/secureprofile) to password-protect Chrome and effectively force other people to use another browser on your system.

Another option is to use a third-party password manager. KeePass (go.pcworld.com/KeePass) and Xmarks (go.pcworld.com/xmarks) are two popular choices worth trying.

Secure Your Synced Data

Chrome can sync most of your settings and saved data (including passwords, but not credit card details) across devices with Chrome installed, but this creates a vulnerability since Chrome requires you to enter only your Google account password to set up a new device for syncing. If intruders were to obtain your Google account password, they could access a list of all your passwords—unless you set a custom encryption syncing passphrase, that is. Once you have done so, you must sign in with »

your Google account password and then enter the passphrase before you can set up new synced devices. This adds an extra layer of security. Open *Settings*, click *Advanced sync settings*, and select *Choose my own passphrase*. While you're there, also consider turning on encryption for all synced data instead of just passwords.

Secure Your Google Account

Google offers several security features for your account, in fact, and you should use them if you use Chrome's sync feature or enjoy multiple Google services.

On the Google Account Security page, consider enabling 2-step Verification, which will ask you to enter a code—sent via text, voice call, or the Google app—whenever you attempt to sign in to Google from a new device. When signing in to applications or features that don't support the verification codes (such as Chrome's sync feature), you'll have to sign in to your Google account, access the 2-step Verification settings, and generate an application-specific password.

While on the Google Account Security page, you might also turn on email and/or phone notifications for password changes and suspicious log-in attempts. In addition, review your recovery options here in case you forget your password in the future. Finally, review your authorized apps and sites, and remove any items that you don't use anymore.

Install Helpful Extensions

Various extensions allow you to add even more security functions to those built into Chrome and Google. Web of Trust (go.pcworld.com/chromewot), for example, can warn you of dangerous sites, and ABlock (go.pcworld.com/chradblock) can remove annoying or malicious advertisements. View Thru (go.pcworld.com/viewthru) lets you see the destinations of shortened URLs, and KB SSL Enforcer (go.pcworld.com/kbssl) can help you take advantage of HTTPS/SSL encryption on websites that support it.

BUGS & FIXES

Firefox 20 Bolsters Privacy Features



NICK MEDIATI

Plus: Updates address vulnerabilities in Opera and in Mac OS X.

THE UNENDING STREAM of security fixes continues. In this month's roundup of new releases and patches, we have another version of Firefox, a fix for Opera, and an update to Mac OS X.

Mozilla Combats Phishing in Firefox 20

With the release of Firefox 20, Mozilla continues its flagship browser's march toward version infinity—and provides a number of timely security fixes too. The latest edition corrects 11 security issues, of which three are rated critical. This version of Firefox corrects a vulnerability that might otherwise allow an attacker to launch a cross-site scripting (XSS) attack or to steal your personal data through a phishing attack. Firefox 20 also comes equipped with a handful of new privacy features, such as improvements to the private-browsing function.

Visit go.pcworld.com/ff20private and go.pcworld.com/ffsecurity to get more details regarding Firefox 20's security and privacy changes.

Opera 12.15 Patches Three Flaws

The Opera 12.15 update addresses a small collection of security issues affecting the browser. One fix corrects a low-rated vulnerability involving cookies that could allow a malicious website to get hold of your login information for another site. A second patch protects the browser from attacks directed against the RC4 encryption protocol (a method of keeping data safe as it is transferred across the Internet); this hazard, too, is rated as low. Finally, the new Opera version also corrects a flaw rated as moderately severe, but as of this writing the specifics about this problem have yet to be disclosed. Go to go.pcworld.com/opera1215 to find out more.

Apple Releases Multiple Fixes in OS X 10.8.3

On the Mac front, Apple recently released the OS X Mountain Lion 10.8.3 update, which features assorted bug fixes and security patches. The fixes include corrections for flaws discovered in Safari, QuickTime, Messages, and various other system components. If you're running OS X 10.6 Snow Leopard or 10.7 Lion, Security Update 2013-001 contains patches that apply to your particular operating system. To get the update, select *Software Update* from the Apple menu. To learn more about this set of fixes, visit go.pcworld.com/mac5672 and go.pcworld.com/mac5612.



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VIAGRA is prescription medication to treat erectile dysfunction (ED). If you don't have a prescription, talk to your doctor to see if VIAGRA is right for you.

IMPORTANT SAFETY INFORMATION BELOW.

Do not take VIAGRA if you take nitrates, often prescribed for chest pain, as this may cause a sudden, unsafe drop in blood pressure.

Discuss your general health status with your doctor to ensure that you are healthy enough to engage in sexual activity. If you experience chest pain, nausea, or any other discomforts during sex, seek immediate medical help.

In the rare event of an erection lasting more than 4 hours, seek immediate medical help to avoid long-term injury.

If you are older than age 65, or have serious liver or kidney problems, your doctor may start you at the lowest dose (25 mg) of VIAGRA. If you are taking protease inhibitors, such as for the treatment of HIV, your doctor may recommend a 25-mg dose and may limit you to a maximum single dose of 25 mg of VIAGRA in a 48-hour period. If you have prostate problems or high blood pressure for which you take medicines called alpha blockers, your doctor may start you on a lower dose of VIAGRA.

In rare instances, men taking PDE5 inhibitors (oral erectile dysfunction medicines, including VIAGRA) reported a sudden decrease or loss of vision or hearing. It is not possible to determine whether these events are related directly to these medicines or to other factors. If you experience sudden decrease or loss of vision or hearing, stop taking PDE5 inhibitors, including VIAGRA, and call a doctor right away.

VIAGRA should not be used with other ED treatments. VIAGRA should not be used with REVATIO or other products containing sildenafil.

VIAGRA does not protect against sexually transmitted diseases, including HIV.

The most common side effects of VIAGRA are headache, facial flushing, and upset stomach. Less commonly, bluish vision, blurred vision, or sensitivity to light may briefly occur.

Please see Important Facts for VIAGRA on the following page or visit viagra.com for full prescribing information.

*There might be an additional shipping and handling surcharge to ship orders outside the 48 contiguous states.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.FDA.gov/medwatch or call 1-800-FDA-1088.

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IMPORTANT FACTS



VIAGRA®
(sildenafil citrate) tablets

(vi-AG-rah)

IMPORTANT SAFETY INFORMATION ABOUT VIAGRA

Never take VIAGRA if you take any medicines with nitrates. This includes nitroglycerin. Your blood pressure could drop quickly. It could fall to an unsafe or life-threatening level.

ABOUT ERECTILE DYSFUNCTION (ED)

Erectile dysfunction means a man cannot get or keep an erection. Health problems, injury, or side effects of drugs may cause ED. The cause may not be known.

ABOUT VIAGRA

VIAGRA is used to treat ED in men. When you want to have sex, VIAGRA can help you get and keep an erection when you are sexually excited. You cannot get an erection just by taking the pill. Only your doctor can prescribe VIAGRA.

VIAGRA does not cure ED.

VIAGRA does not protect you or your partner from STDs (sexually transmitted diseases) or HIV. You will need to use a condom.

VIAGRA is not a hormone or an aphrodisiac.

WHO IS VIAGRA FOR?

Who should take VIAGRA?

Men who have ED and whose heart is healthy enough for sex.

Who should NOT take VIAGRA?

- If you ever take medicines with nitrates:
 - Medicines that treat chest pain (angina), such as nitroglycerin or isosorbide mononitrate or dinitrate
- If you use some street drugs, such as “poppers” (amyl nitrate or nitrite)
- If you are allergic to anything in the VIAGRA tablet

BEFORE YOU START VIAGRA

Tell your doctor if you have or ever had:

- Heart attack, abnormal heartbeats, or stroke
- Heart problems, such as heart failure, chest pain, angina, or aortic valve narrowing
- Low or high blood pressure
- Severe vision loss
- An eye condition called retinitis pigmentosa
- Kidney or liver problems
- Blood problems, such as sickle cell anemia or leukemia
- A deformed penis, Peyronie’s disease, or an erection that lasted more than 4 hours
- Stomach ulcers or any kind of bleeding problems

Tell your doctor about all your medicines. Include over-the-counter medicines, vitamins, and herbal products. Tell your doctor if you take or use:

- Medicines called alpha-blockers to treat high blood pressure or prostate problems. Your blood pressure could suddenly get too low. You could get dizzy or faint. Your doctor may start you on a lower dose of VIAGRA.
- Medicines called protease inhibitors for HIV. Your doctor may prescribe a 25 mg dose. Your doctor may limit VIAGRA to 25 mg in a 48-hour period.
- Other methods to cause erections. These include pills, injections, implants, or pumps.
- A medicine called REVATIO. VIAGRA should not be used with REVATIO as REVATIO contains sildenafil, the same medicine found in VIAGRA.

POSSIBLE SIDE EFFECTS OF VIAGRA

Side effects are mostly mild to moderate. They usually go away after a few hours. Some of these are more likely to happen with higher doses.

The most common side effects are:

- Headache
- Feeling flushed
- Upset stomach

Less common side effects are:

- Trouble telling blue and green apart or seeing a blue tinge on things
- Eyes being more sensitive to light
- Blurred vision

Rarely, a small number of men taking VIAGRA have reported these serious events:

- Having an erection that lasts more than 4 hours. If the erection is not treated right away, long-term loss of potency could occur.
- Sudden decrease or loss of sight in one or both eyes. We do not know if these events are caused by VIAGRA and medicines like it or caused by other factors. They may be caused by conditions like high blood pressure or diabetes. If you have sudden vision changes, stop using VIAGRA and all medicines like it. Call your doctor right away.
- Sudden decrease or loss of hearing. We do not know if these events are caused by VIAGRA and medicines like it or caused by other factors. If you have sudden hearing changes, stop using VIAGRA and all medicines like it. Call your doctor right away.
- Heart attack, stroke, irregular heartbeats, and death. We do not know whether these events are caused by VIAGRA or caused by other factors. Most of these happened in men who already had heart problems.

If you have any of these problems, stop VIAGRA. Call your doctor right away.

HOW TO TAKE VIAGRA

Do:

- Take VIAGRA only the way your doctor tells you. VIAGRA comes in 25 mg, 50 mg, and 100 mg tablets. Your doctor will tell you how much to take.
- If you are over 65 or have serious liver or kidney problems, your doctor may start you at the lowest dose (25 mg).
- Take VIAGRA about 1 hour before you want to have sex. VIAGRA starts to work in about 30 minutes when you are sexually excited. VIAGRA lasts up to 4 hours.

Don't:

- Do not take VIAGRA more than once a day.
- Do not take more VIAGRA than your doctor tells you. If you think you need more VIAGRA, talk with your doctor.
- Do not start or stop any other medicines before checking with your doctor.

NEED MORE INFORMATION?

- This is only a summary of important information. Ask your doctor or pharmacist for complete product information OR
- Go to www.viagra.com or call (888) 4-VIAGRA (484-2472).



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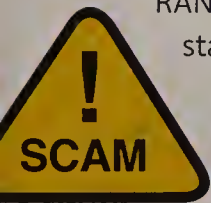


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Ransomware Reads Victims' Browsers



RANSOMWARE AUTHORS ARE starting to use the browsing histories of infected PCs to make their scams more believable, according to an independent malware researcher.

Ransomware is a class of malware designed to extort money from victims by disabling system functionality or by encrypting personal files. One variation shows messages masquerading as notifications from law enforcement agencies.

In late March, an independent malware analyst known online as Kafeine spotted a variant, dubbed Kovter, that displays a warning allegedly from the U.S. Department of Justice, the U.S. Department of Homeland Security, and the FBI claiming that the victim's PC was used to download and distribute illegal content. The alert also lists the PC's IP address, its host name, and a website from which the illegal material was allegedly downloaded.

The malware checks whether any of the sites in the computer's browser history is present in a remote list of porn sites (whose content is not necessarily illegal); if it finds a match, it displays that site name in the message.

The average number of daily infection attempts using police-themed ransomware has doubled in the first months of 2013, according to Sergey Golovanov, a malware expert on the global research and analysis team at antivirus vendor Kaspersky Lab. According to Golovanov, victims should steadfastly refrain from paying the cybercriminals any money. "What you need to do is go to another computer and start searching for a solution," he says. "All antivirus companies post free instructions and utilities to help users unblock their computers."

—Lucian Constantin

PRIVACY WATCH

Get Your Privacy Ducks in a Row

The excellent DuckDuckGo search engine doesn't try to track you.



ALEX WAWRO

GOOGLE, BING, AND Yahoo are bitter rivals in their quest for your search engine affection, but they have at least one thing in common: They track your search history and tailor the results of your queries to your interests. Yes, they're attempting to improve your search experience, but that sort of surveillance is anathema to privacy enthusiasts and anyone who doesn't want to be stuck in an echo chamber of their own interests. DuckDuckGo is a different kind of search engine, designed to capitalize on the big shots' poor privacy practices by offering an alternative that's simple and anonymous.

Private Searching Made Easy

At duckduckgo.com, just type your query and click the green magnifying-glass search button. DuckDuckGo employs HTTPS encryption and will not include your search query when it builds links to websites, so the sites you visit won't know what terms you used to find them. DuckDuckGo also refrains from logging your queries and doesn't tailor results based on your browsing history, so you're guaranteed to get unfiltered access to the Web.

If your search results don't pop up quite as quickly as they do on Google, that's because DuckDuckGo isn't just checking your query against its own database (carefully collected by the DuckDuckBot Web crawler)—it's simul-



taneously running your search across Google, Bing, Yahoo, and more than 30 other search engines. DuckDuckGo will also check against Wikipedia, Wolfram Alpha, and other knowledge engines to try to create short summaries, called "0-click boxes," that answer your query so that you don't have to click through.

If you don't want to wait, you can switch off 0-click boxes in the Results section of the DuckDuckGo Settings menu. While you're there, consider turning on the integrated Web of Trust ratings for your

search results, which will cause DuckDuckGo to display color coding to help you gauge whether the link is safe to click: green is all clear, yellow suggests caution, and red signals danger. Web of Trust ratings are crowdsourced from millions of volunteers who rate sites' trustworthiness in handling user data.

DuckDuckGo isn't new, and it won't topple Google or Bing anytime soon, but it is the best search engine in regard to respecting user privacy. It's refreshing to see a common-sense privacy policy that has all the settings tuned in your favor by default, and that alone is reason enough to try DuckDuckGo. ●

Reviews & Ratings

The New Wave of Micro PCs

PCs continue to shrink, thanks to new CPUs. These three models can do all but the most strenuous computing tasks.

BY JON L. JACOBI

THE DESKTOP PC isn't dead, it's just shrinking. A new breed of miniature marvels is on the market, boasting a nonexistent footprint when attached to the back of a display. Unlike some micro-size, micro-priced computers—the \$35 Raspberry Pi, for example—these incredibly

small machines provide more than enough processing power for all but the most strenuous computing chores.

New generations of powerful but cool-running CPUs are largely responsible for this shrinkage, and both AMD and Intel have conjured tiny PCs to demonstrate what's possible with them. Intel calls its concept the Next Unit of Computing (NUC); AMD's primary manufacturing partner, Sapphire Technology, has dubbed its effort the Edge VS8. A third entry is Lenovo's IdeaCentre Q190, which is a



▲ **Intel's DC3217IYE** is a miniature marvel.

◀ **Sapphire's Edge VS8** offers plenty of ports.



44 HP Envy X2



46 HP LaserJet Pro 200



54 Samsung EX2F

little bigger than the others and has optical-drive options.

Alas, none of them is cheap.

Intel Next Unit of Computing

Intel's vision of a miniature computer measures 4 inches square by 2 inches high, and is available in three kits: The \$323 DC3217BY features a Core i3 3217-U processor, an HDMI audio-video port, and a Thunderbolt port (supporting DisplayPort 1.1a); the \$293 DC3217IYE has the same CPU and dual HDMI ports; and the \$172 DCCP847DYE has a Celeron 847 processor and dual HDMI ports. (Video resolution via HDMI maxes out at 1920 by 1200 pixels in all three.)

Those prices don't include memory or the solid-state drive required for storage, so add another \$100 to \$200 for such components. Also, you must buy an AC power cord (about \$5). Intel does include a VESA-standard mounting plate, so you can attach the NUC to the back of a display.

All three NUC versions include full- and half-size mini-PCIe slots, two USB 2.0 ports, a gigabit ethernet port, and a

Kensington lock socket, but no ports for USB 3.0 or eSATA, even though the QS77 Express chipset on all three motherboards supports those features. The DC3217BY model's Thunderbolt support provides a fast, if premium-priced, external storage option.

The NUC's performance—at least in the DC3217IYE we tested after adding a 4GB SODIMM and a 240GB Intel m525 mSSD—was quite good. It scored above 60 on our WorldBench 8 test suite, and gaming frame rates are playable at lower resolutions. The NUC is also quiet, since it has no cooling fans: The case acts as a heat sink and is warm to the touch under heavy load.

Overall, the NUC is a neat, but not particularly versatile, little unit. (See page 86 in the May issue or go.pcworld.com/nuc to learn how to add it to your home theater.) The price may seem high, but when you cost out similar components for a mini-ITX unit, you're not paying as much for the small size as you might think. However, you are losing the ability to expand storage internally and to upgrade the graphics.

Sapphire Edge VS8

The jet-black Sapphire Edge VS8 is easily mistaken for a Wi-Fi router, given its dimensions: 7.80 inches high by 7.20 inches deep by 1.25 inches thick. Unlike the NUC, the Edge ships with everything you need, offering 4GB of memory, a 500GB hard drive, and a VESA mount. You also get a power cord, plus HDMI and optical S/PDIF cables and an HDMI-to-DVI adapter.

Sapphire expects to fetch \$429 for the package.

The Radeon HD 7600G GPU integrated into the Edge VS8's accelerated processing unit (APU) performs considerably better than the NUC's HD 4000 graphics. Truly playable frame rates, however, are available only at resolutions of 1024 by 768 pixels or lower. But the somewhat slow 500GB, 5400-rpm hard drive made the Edge VS8 feel

less than sprightly. The unit scored a mere 34 on WorldBench 8 (comparable to a low-end notebook). The Edge needs an SSD option.

Sapphire's machine clearly beats the NUC in ports: The Edge VS8 has a gigabit ethernet port, two USB 3.0 ports, four USB 2.0 ports, an SD Card reader, analog audio in/out, S/PDIF audio out, HDMI (with a maximum resolution of 1920 by 1200 pixels), and a DisplayPort (2560 by 1600 resolution, maximum).

Note: Finding the chipset drivers for an AMD APU can be extremely frustrating. Try go.pcworld.com/amddriver.

Lenovo IdeaCentre Q190

Compared with Intel's diminutive NUC and Sapphire's slim and sexy Edge VS8, Lenovo's IdeaCentre Q190 is a full-sized micro PC. It boasts >>



Tested in PCWorld Labs

Products reviewed in this section—both hardware and software—have been tested by the editors. Hardware goes through a formal, rigorous testing procedure in our lab.

The idea of micro PCs is so appealing that, while current iterations have their limitations, we expect to see better-rounded and faster versions available in the near future.

a ton of ports, has enough interior space to move air over its components, and has a Blu-ray drive option. For a home-theater PC, those are important features.

The Q190 is a small monolith measuring 6.10 by 7.55 inches. It's 0.86 inch thick (expanding to 1.5 inches thick with its piggyback slot-feed optical drive attached). A stand that stabilizes the unit when upright adds about another half-inch of height, but Lenovo also provides a VESA mounting bracket

so you can mount the Q190 on the back of a display.

Mic and headphone jacks, two USB 3.0 ports, and a six-in-one media-card reader are hidden behind a door on the front. On the back you'll find HDMI and VGA video outputs, three USB 2.0 ports, ethernet, an optical S/PDIF port, and the power jack for the AC adapter. The computer and the optical drive both have Kensington lock points. The Q190 also has a built-in 802.11b/g/n wireless network adapter. The bundled

keyboard and mouse are middling units, but Lenovo's palm-size Enhanced Multimedia Remote, which combines a backlit QWERTY keyboard and fingertip mouse and

costs \$80, is worth a look if you plan to operate the system from your sofa.

The Q190 is not quite as silent as the nearly noiseless NUC, or the Edge with its super-quiet fan, but we didn't find its noise signature to be bothersome.

Lenovo offers the Q190 in several flavors. The model we tested came configured with a 1.5GHz Celeron 887 CPU; 4GB of DDR3/1600 memory; a 500GB, 5400-rpm hard drive; and a DVD-RW drive. It posted an unimpressive score of 28 on WorldBench 8. That's slow, but once it booted and the 64-bit Windows 8 OS had finished caching, the unit proved responsive enough.

That said, its integrated HD graphics system means that modern gaming is not in this machine's repertoire. And you'll need a particularly efficient media player—such as CyberLink's PowerDVD, which uses hardware acceleration—to render 1080p at higher bit rates (obviated in the Q190 model that ships with a Core i3 processor).

Our test unit sells for \$397. As most vendors do, Lenovo offers deals that may or may not last. At this writing, the least-expensive Q190 was our configuration, sans the DVD drive, for \$349. The most expensive was a Core i3-2365M model with 8GB of memory, a 1TB hard drive, and a Blu-ray player for \$649.

Oddly enough, however, the Q190 has no SSD option.

The IdeaCentre Q190 gets you most of the way toward micro computing, and its optical-drive options render it more versatile than its smaller rivals.

Head-to-Head Comparison

Performance: While the NUC is the clear winner in both everyday performance and subjective feel, the Sapphire managed better frame rates with games; the IdeaCentre Q190 lagged the others.

Storage: Intel expects you to supply an mSATA SSD for the NUC, and that will be faster than any hard drive. The Edge VS8 and the IdeaCentre Q190 both offer 500GB hard drives.

Ports: The lack of eSATA, USB 3.0, and any audio other than HDMI are definite drawbacks to the NUC. The version equipped with Thunderbolt is great, if you have the premium-priced peripherals needed. The Edge VS8 has all you'd expect, including DisplayPort. The Q190 has an array nearly as good.

Overall: None of the three is the perfect micro PC. But the idea of such PCs is so appealing that it's bound to catch on. We expect to see better-rounded and faster versions in the near future.



Lenovo's IdeaCentre Q190 can sit upright.

MORE ONLINE

For complete reviews of these products, see go.pcworld.com/micropcs and go.pcworld.com/q190.

Razer Edge Pro: Insane Performer, but Impractical

PC GAMING IS poised to break free of the desktop; it just needs a device that delivers fast frame rates and lush graphics in a portable package. Enter the Razer Edge Pro, a Windows 8 tablet built for playing PC games on the go.

However, Razer also bills the Edge Pro as a replacement for your laptop, desktop, tablet, and even game

go-for-broke hardware setup helped the tablet earn top marks in *PCWorld*'s suite of performance benchmarks.

And the tablet has the raw processing power to do everything: It delivers high frame rates in games, runs legacy Windows applications (thanks to Windows 8 Pro), and handles processor-intensive productivity apps such as

in a pitiful 4 hours. Also, the tablet ran uncomfortably hot during gaming sessions.

Solid Chassis, Subpar Display

The Edge Pro's composite-aluminum body feels chubby but durable: The tablet weighs roughly 2.25 pounds and measures just over 20mm thick. It survived a week bumping around San

applications. The solution is to hook up an external display, but the tablet's single USB 3.0 port makes this hard. You'll likely need to shell out for a docking station.

Which brings me to a key problem with the Edge Pro: To use it as a full-fledged desktop PC replacement, an HDTV gaming console, or a mobile gaming machine, you must invest in Razer's portfolio of pricey peripherals: The \$99 Docking Station; the \$249 Gamepad Controller; and the \$69 Razer Edge extended battery, which fits into the Gamepad Controller.

This is a Windows 8 tablet that only gamers could love, and even then only if they shell out almost two grand for the premium model plus all accessories. For that price, you could pick up an Xbox 360, a Nexus 7 tablet, and enough hardware to build your own gaming PC—and still have a little cash left over to spend on games.

Bottom Line

The Razer Edge Pro is the most powerful Windows 8 tablet *PCWorld* has ever seen, but it's a luxury product. By itself, it isn't a practical substitute for any one of the devices that it aims to replace, save perhaps a Windows tablet. And even then it can't match the price, portability, or convenience of the Microsoft Surface Pro. —Alex Wawro ★★★★★; \$1450; Razer; go.pcworld.com/razeredgepro



The Edge Pro is at its best—and heaviest—when jacked into the Gamepad Controller accessory.

console. After using it as my primary device for a week, I think it comes close to delivering on its promise—if you're willing to make big compromises.

Top Performance

Our \$1450 review model came fully loaded with a 1.9GHz Core i7 processor and discrete Nvidia graphics, plus an Intel HD 4000 graphics chip, 8GB of RAM, and a 256GB solid-state drive. This

Photoshop with aplomb.

The Edge Pro delivered 73 frames per second running *Dirt Showdown*—more than twice what Microsoft's Surface Pro tablet did (though this is partly due to the Edge Pro's lower native resolution). It also outperformed its competition in our PCMark 7 productivity suite.

This great performance has a flip side, though. In our battery tests, the Edge Pro burned through a full charge

Francisco in my crowded messenger bag without so much as a scratch.

The tablet's 10.6-inch, 1366-by-768-pixel touchscreen, while functional, was a letdown when I watched movies and played games—things the Edge Pro is designed to excel at. The screen is certainly big enough for playing games, as long as you run them full screen, but it felt cramped when I was trying to manage multiple desktop

Dell's Latitude 6430u Is Consistently High Quality

IN A WORLD of cheap-feeling merchandise, the Latitude 6430u stands apart. It is sedately handsome, remarkably stable in your hand and on the table, and a tactile joy to use. It's also fast and available with a variety of warranty and support options, as a corporate PC should be.

Because it's ruggedized, the 6430u weighs a hefty 4 pounds, but the flat battery pack that fills the lower front quarter of the unit gives the laptop a balance that makes it feel lighter than it is.

The 6430u's heft also makes it a very stable typing platform, which accentuates the already nice feel of the backlit, Chiclet-style keyboard. The keyboard response is a little lighter than a Lenovo's, but the overall experience might be a wee bit better. The unit's touchpad has a silky-smooth response, and buttons on the top and bottom reduce hand travel when clicks are required. Even the eraserhead pointer is well adjusted.

Our \$1279 test unit sported a Core i5-3427u processor, 8GB of RAM, and a 128GB solid-state drive, which helped the unit earn a very capable 78 out of 100 on PCWorld's WorldBench 8 test suite. The Intel HD 4000 integrated graphics made gameplay mediocre but doable. Battery life is a very nice 6 hours, 18 minutes. Entry-level pricing starts at around \$900.

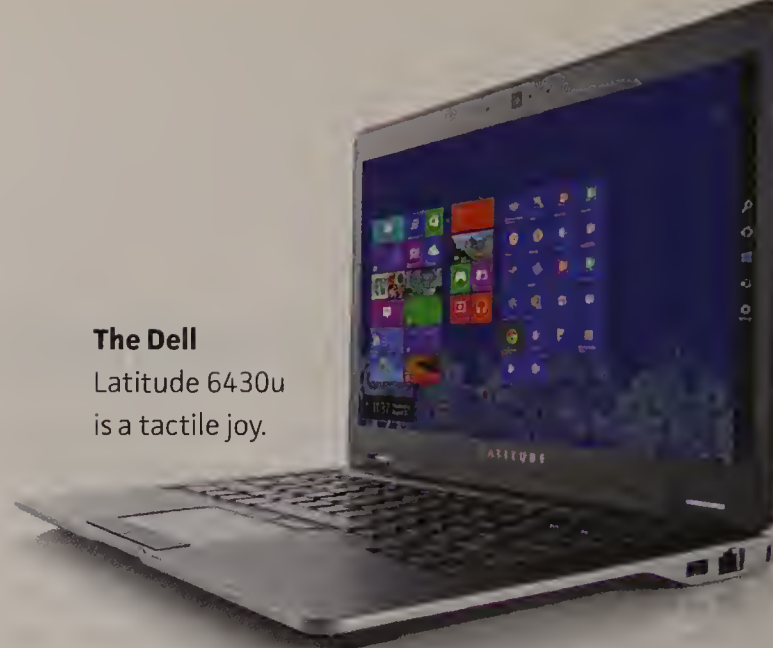
The test unit shipped with Windows 8 (a Start Menu replacement would be welcome). All flavors of the more business-friendly Windows 7 are available. A three-year warranty is standard.

One might quibble with a pricey laptop whose 14-inch display tops out at a 1366-by-768-pixel resolution. But unless you need to run 1080p video, the display looks great.

The 6430u comes with a

The Dell

Latitude 6430u is a tactile joy.



nice blend of legacy and modern ports. Our review unit also had dual-band 802.11n Wi-Fi and Bluetooth 4.0. Broadband (including LTE) and WiGig cards are available.

The Latitude 6430u is pricey, but most superb things are. Even consumers should

consider this Ultrabook, since the entry-level configuration is more than adequate for most purposes, and the three-year warranty makes a big-box store's extended warranty unnecessary. —Jon L. Jacobi ★★★★★; \$1279; Dell; go.pcworld.com/dell6430u

HP Envy x2: Pretty, but No Speedster

WITH ITS SLEEK, brushed-silver finish and thin clamshell design, the Envy x2 will indeed prompt envious glances in the café. But a speed demon it's not. Still, this tablet-laptop hybrid delivers enough battery life and performance to more than adequately fill both of its roles.

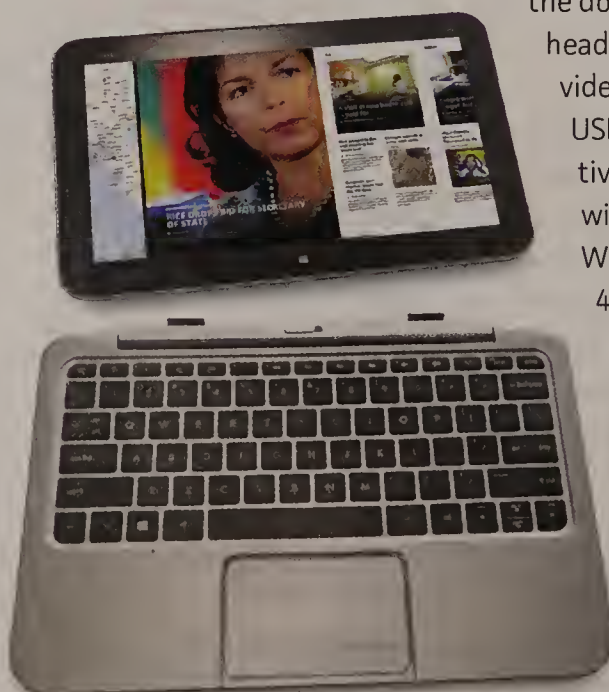
The Envy x2 sports a 1366 by 768 (16:9), 11.6-inch display that shows off video well and is adequately bright. The tablet weighs a comfortable 1.54 pounds, with the 1.56-pound keyboard/port dock bringing that up to an easily totable 3.1 pounds.

Most of the ports reside on the dock, including a headset jack, HDMI video output, and two USB 2.0 ports. Connectivity is all tablet-side, with 802.11 a/b/g/n Wi-Fi and Bluetooth 4.0. Because the tablet itself lacks USB and a card reader, you'll be able to

offload data only via Wi-Fi or when the Envy x2 is docked.

With a 1.8GHz Intel Atom Z2760 processor, 2GB of DDR2 memory, and a 64GB solid-state drive, the Envy x2 earned a score of just 18 (out of 100) on our WorldBench 8 test suite—that's *slow*. Nevertheless, the x2 somehow manages to feel lively enough when you're hands-on. Battery life is excellent: The unit ran for 13 hours, 22 minutes with the tablet docked and 8 hours, 31 minutes untethered.

All in all, the Envy x2 is a nice-looking, well-priced, and more than workable Windows 8 tablet. It's also eminently viable as a light-use laptop PC. In short, a nice job, and yes, I was just a tad envious when I had to turn the Envy x2 back in. —Jon L. Jacobi ★★★★★; \$700; HP; go.pcworld.com/hpenvyx2



HP's Envy x2

tablet-laptop hybrid is good for light use.



LennartAlsing
lennartalsing.site90.com
www.youtube.com/lennartalsing

LIFE IS JUST A GAME

www.razerzone.com

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FOR GAMERS. BY GAMERS.™

Chromebook 3: A Laptop-Shaped Tablet, but Better

SAMSUNG'S SMALL, SLIM, and speedy Series 3 Chromebook looks like a laptop, but it performs more like a tablet. It runs the Web-based Chrome operating system, so if you mostly surf the Web and create content, this tablet with an integrated keyboard may well suit your needs.

Our \$250 review model came with a 1.7GHz Samsung Exynos 5 dual-core ARM processor, 2GB of memory, integrated graphics, and 16GB of hard drive space (though you get 100GB of cloud storage for two years). It also has built-in 802.11 a/b/g/n Wi-Fi, two USB ports (one USB 3.0, one USB 2.0), a card reader, a headphone/microphone port, and an HDMI-out port.

Because the Chromebook is technically a tablet, we tested it using our tablet benchmark tests, and it performed very well compared to its tablet competition in the HTML5 browser and JavaScript tests. It also loaded pages quickly.

The silver-colored Chromebook looks a lot like a slightly thicker and heavier 11-inch Apple MacBook Air, except that it's made of plastic. But even so, it feels very sturdy.

But unlike the Apple laptop's keyboard, the full-size keyboard is built for Chrome. You'll find no Windows, Apple, Caps Lock, or Fn key. Instead, you get dedicated keys for various tasks. This setup can

Samsung's quasi-laptop runs on Chrome OS.

take getting used to. And the multitouch trackpad lacks a physical right-click function.

The Chromebook's 11.6-inch matte-finish LED display has a resolution of 1366 by 768 pixels—perfectly acceptable given the Samsung's size and

price. Images and text looked crisp and clear, though some colors look a little washed-out at the brightest settings.

Because this tablet runs the Chrome OS, you can't use traditional software—you have to use either Google or

other Web-based apps.

This Chromebook isn't for everyone, but it's a cheap and productive alternative to a similarly equipped tablet.

—Sarah Jacobsson Purewal
★★★★☆; \$250; Samsung; go.pcworld.com/chromebook3



HP LaserJet Pro 200 M251nw

LOW-COST COLOR LASERS like the \$329 LaserJet Pro 200 Color Printer M251nw often appeal to small-office users (though an inkjet is a better deal in this range). But such lasers tend to be slow and low in functions, with costly toner. The M251nw fits that trend, but it also has innovative features and nice output.

The M251nw has Wi-Fi, ethernet, and USB connectivity. HP's ePrint cloud-printing services are another bonus, with capabilities such as remote printing via email and access to Web-based apps and

services. Duplexing, unfortunately, is only manual.

The cost of consumables is high: A monochrome page averaged 4.2 cents, and a four-

color page, 18.1 cents. But on the upside, text appears supersharp, monochrome graphics are smooth, and color graphics are also very good for a laser, if a bit dark.

The printer output both text and mixed-text/monochrome graphics pages at an aggregate 9.2 pages per minute on the PC and 8.6 ppm on the Mac—decently fast.

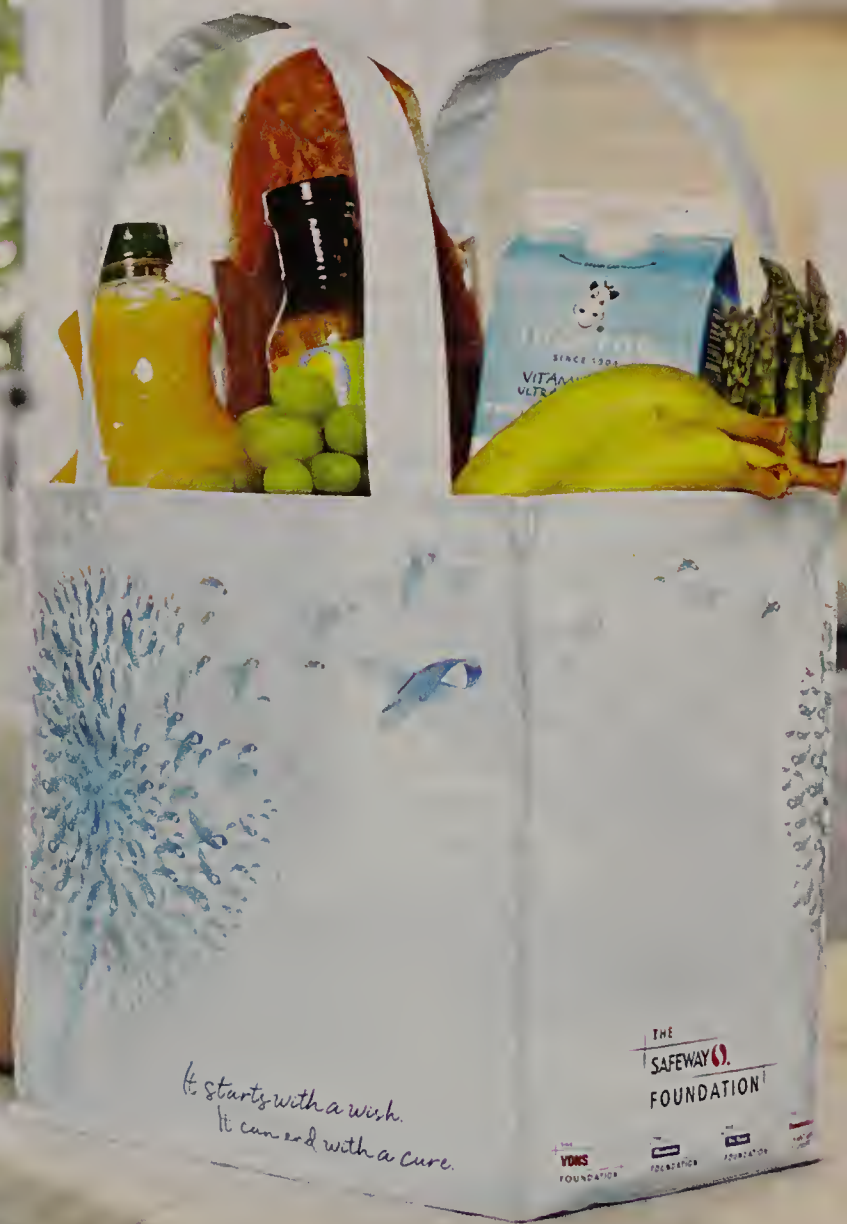
The M251nw is one of the best choices in its class. —Jon L. Jacobi

and Melissa Riofrio
★★★★☆; \$329; HP; go.pcworld.com/laserjetpro200



HP LaserJet Pro 200 M251nw.

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A WISH
IT CAN END WITH
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Stand Up To Cancer is a program of the Entertainment Industry Foundation, a 501 (c) (3) charitable organization.

\$2 from the sale of the \$2.99 reusable bag will benefit prostate cancer research.

Photo by Randall Slavin

1 in 6 men will be diagnosed with prostate cancer in his lifetime. When you choose this limited-edition bag, you're supporting vital research to help find a cure. Available at your local Safeway stores during the month of June, while supplies last.

To help The Safeway Foundation and Stand Up To Cancer, and to get the facts about prostate cancer, go to SafewayFoundation.org.

BenQ, HP Pavilion Displays: Similar Only in Resolution

THE BENQ VW2430 and the HP Pavilion 27xi both have 1920-by-1080 displays. But aside from resolution, they have more differences than similarities, and making a choice between the two requires consideration of size, performance, and price.

Display and Design

The displays use the same number of pixels, but they are spread across differently sized screens. The BenQ VW2430 screen measures 23 inches diagonally, while the HP Pavilion 27xi measures 27 inches. Because of the roomier screen, the HP Pavilion 27xi displays larger text at its native resolution. This is an advantage for users who have trouble seeing small type, or if you plan to use the display from a distance. On the downside, the extra space between pixels can give icons and images a grainy appearance and make text look less smooth. That said, the BenQ VW2430's text also wasn't very clean, despite its advantage in pixel pitch.

On the positive side, both displays use LED backlights. They use less energy to operate than other displays, and they contain fewer environmentally hazardous materials.

The HP Pavilion 27xi is considerably thinner than the BenQ VW2430 but it uses an external power brick, while the VW2430 has an internal power supply. Neither offers

much in terms of ergonomic adjustment. They can tilt forward and back a few degrees, but they can't move up or down, swivel, or rotate.

The HP Pavilion 27xi has a sleek, brushed-aluminum look and a black color scheme, while the BenQ VW2430 has a bulky, white plastic appearance. It also includes a little green dish on the base with a two-pronged stand that can

people around your screen, the VW2430's narrow angle of view could be a problem.

The BenQ VW2430 has a matte screen, while the HP Pavilion 27xi sports a glossy look. Glossy screens can give photos increased color depth, which is what we saw with a series of test photo files on the Pavilion 27xi, but they are also susceptible to glare and annoying reflections. If you

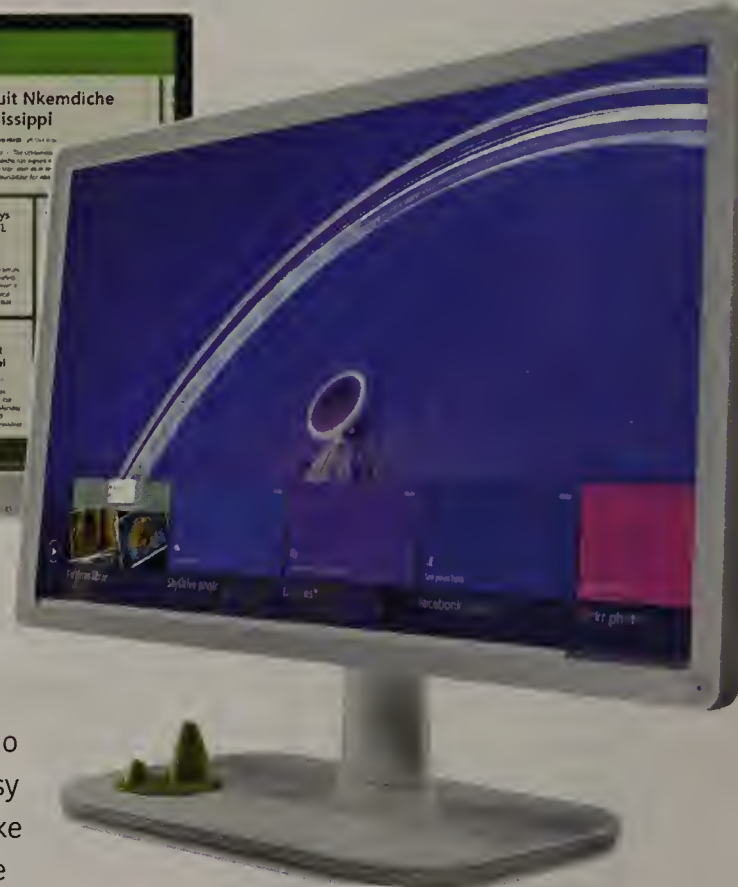
The HP Pavilion 27xi, on the other hand, had a very neutral gray at its default settings.

Bottom Line

Despite its low pixel density, the HP Pavilion 27xi is a very good display that offers excellent viewing angles and neutral grays. In contrast, the BenQ VW2430's overly warm color temperature, mediocre image quality, and narrow



HP's Pavilion 27xi sports a sleek look.



The BenQ VW2430 offers a holder for your phone.

hold your phone. The stand easily moves around in the dish, however, making me a bit uncomfortable using it.

The HP Pavilion 27xi uses an In-Plane Switching LCD panel, which is more expensive than the BenQ VW2430's standard TFT display. The advantage of IPS is its extremely wide viewing angle, and indeed, the HP Pavilion 27xi looked great at even extreme angles, while the BenQ VW2430 began to show shifts in color and contrast at even minor angles. If you collaborate with other

decide to go with a glossy screen, make sure to take your work environment into account.

The main concern I had with the BenQ VW2430 is that, despite trying all sorts of settings, I couldn't get a neutral gray. The display was very pink, and if I changed the color temperature to its "bluish" setting, the screen looked purple; if I changed the setting to "reddish," the screen looked more yellow.

viewing angle make it difficult to recommend, even on its own and not compared to the HP display. —James Galbraith

★★★★☆; \$229;

BenQ VW2430

★★★★★; \$300;

HP Pavilion 27xi

go.pcworld.com/benqandhp

Dell's UltraSharp U3014 Delivers the Big Picture

A 30-INCH desktop giant, the Dell UltraSharp U3014 offers a resolution of 2460 by 1600 pixels on a matte IPS screen with LED backlighting.

You may need help attaching the heavy monitor to its stand. But once that's done, you can connect it to your computer using your choice of DVI, HDMI, DisplayPort, or Mini DisplayPort. It also offers a host of USB 3.0 ports, along with a handy memory card reader. The unit doesn't have built-in speakers, but you can

attach Dell's speaker bar to it.

The U3014 is calibrated for color and brightness uniformity, but it also offers a comprehensive set of menus if you'd like to make your own tweaks. All LCDs are susceptible to image retention, and if you detect ghosting, you can just push a button to launch an LCD Conditioning routine to get rid of the problem.

The matte IPS panel has a very wide viewing angle, which is important for a display of this size. I also encour-



The U3014's IPS panel has a very wide viewing angle.

tered much less glare from the matte screen than from a comparable glossy screen.

Making the jump from a 27-inch display to a 30-inch display is a substantial invest-

ment. But if you need a professional feature set in a very large monitor, Dell's U3014 delivers. —James Galbraith ★★★★★; \$1500; Dell.go.pcworld.com/u3014

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Drive Showdown: Voyager Air and Wireless Plus

WHAT COULD BE better than a portable hard drive? A battery-powered portable hard drive that provides its own Wi-Fi hotspot, of course. Corsair's Voyager Air and Seagate's Wireless Plus have hefty price tags compared to ordinary drives, but they are also extremely convenient.

Corsair Voyager Air

In terms of connectivity, the Voyager Air is versatile. It can create its own Wi-Fi hotspot, so you can transfer files over a wireless network, but it can also connect to a public hotspot and pass that Internet connection through to its own clients. In addition, the drive is outfitted with a USB 3.0 port for direct connection to a PC, and its gigabit ethernet port lets you use it as either a wired or wireless NAS.

On the downside, it lacks a Web portal for viewing media, and it's not DLNA compliant. It works fine with PCs, however, and Android and iOS apps are available for smartphones and tablets. Corsair has promised a firmware upgrade that will add a Web portal and DLNA compatibility.

The Voyager Air delivered very good performance via USB 3.0 in our benchmark tests. It wrote our 10GB mix of files at 101.5 MBps and read them at 210.5 MBps. It was slightly faster when working with a single 10GB file, writing at 109.2 MBps and then reading at 245.6 MBps. File transfers via gigabit ethernet, however, were

surprisingly slow: It wrote the mix of files at 14.6 MBps and read them at 28.0 MBps. Even so, it offered smooth wireless streaming, with no dropouts or pauses, at bit rates as high as 2 MBps. In my tests, the battery lasted for just over 5 hours while streaming a high-bit-rate movie.

The Voyager Air has great

net connectivity. It provides two features that are even more important: a Web portal and DLNA compliance.

Seagate's drive also possesses a more elegant industrial design, with just a single power button on its case. The Wi-Fi hotspot is always on unless the drive is connected to a computer's USB port.

The presence of a DLNA-compliant media server means you can use your client's own application to stream digital photos, video, and music from the drive.

▼ **The Voyager Air** lacks a Web portal and is not DLNA compliant.

1TB drive wasn't quite as fast as Corsair's: Connected via its USB 3.0 interface, it wrote our 10GB mix of files and folders at 93.0 MBps and read the batch at 208.3 MBps. With a single large 10GB file, write and read speeds were 106.4 MBps and 247.1 MBps respectively. Streaming multimedia via Wi-Fi was smooth, right up until about 2 MBps.

Seagate claims up to 10 hours of battery life for the Wireless Plus, but qualifies that heavily. The drive ran for only 4 hours while streaming a high-bit-rate video. This is an admittedly extreme scenario, and you'll get better life with shorter movies and more typical usage.

Like the Voyager Air, the

Wireless Plus automatically turns off its wireless hotspot when you hardwire the drive to your PC's USB port. But unlike with Corsair's drive, I had to reboot the Seagate drive to reestablish a wireless connection. The wireless hotspot was visible to my laptop, but the PC would not connect to it.

Seagate's Wireless Plus is a good-quality product that costs \$20 less than the rival 1TB Voyager Air. The absence of an ethernet port means it's not as versatile, but its inclusion of a DLNA server and a Web portal is an advantage. ★★★★★; \$200; Seagate; go.pcworld.com/airandplus

—Jon L. Jacobi



▲ **The Wireless Plus** omits an ethernet port.

promise, and the onboard ethernet is handy. It'll be better when the Web portal and DLNA compliance are added. ★★★★★; \$220 (1TB); \$180 (512GB); Corsair

Seagate Wireless Plus

The Wireless Plus is a more polished product than the Voyager Air, despite the absence of hardwired ether-

net connectivity. Seagate also provides free apps for iOS and Android smartphones and tablets, as well as Amazon's Kindle Fire.

The Wireless Plus features Seagate's Universal Storage Module technology, which means the hard drive has a recessed SATA connector that you can mate to a variety of interface adapters.

In our testing, Seagate's

Dell Offers a More Usable Touchscreen AIO

DELL HAS DELIVERED a very usable touchscreen all-in-one system in the OptiPlex 9010. And all the company had to do was put the touchscreen within easy reach.

Dell worked this minor miracle by engineering a double-jointed stand that allows you to move the display up and down and slightly forward. Even better, it has a standard VESA mount point, so you can also use a fully articulated wall- or desk-mounted arm for truly versatile placement.

In a market filled with AIOs that block the usable surface area behind them, the 9010's minimal footprint leaves all the surrounding area accessible. Dell also ships it with a wireless mouse and keyboard.

The 9010 comes with PS/2 mouse and keyboard ports, but its omission of an HDMI input renders it less attractive as you can't use it with a gaming console or a set-top box.

Our unit came with most of the top-of-the-line component options. It was fast, scor-



Dell's OptiPlex 9010 sports a touch-friendly design.

ing 113 on our WorldBench 8 tests. The 23.6-inch display shows sharp pictures, and the AIO is secured via Intel's Trusted Platform Module.

Dell got touch right with

the OptiPlex 9010, and from a practical point of view, it's one of the best all-in-ones on the market. —Jon L. Jacobi

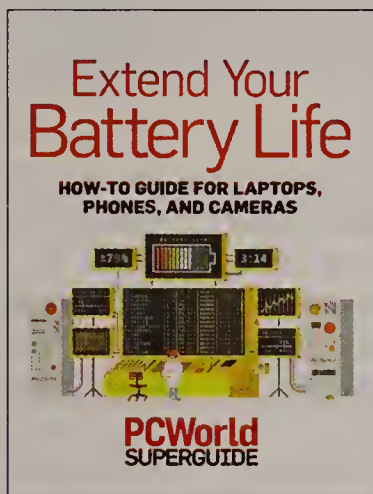
★★★★★; \$1256; Dell; go.pcworld.com/optiplex

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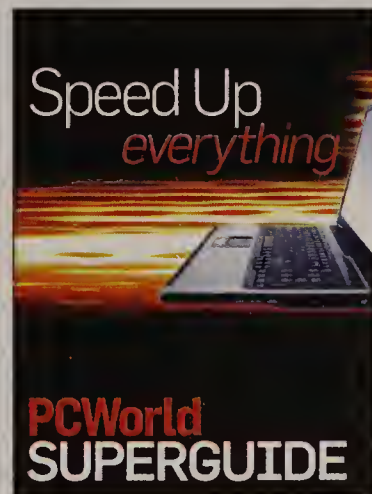
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Bioshock Infinite Delivers High-Flying Adventure



IT'S NOT OFTEN a game makes me wish I could travel back in time to experience it again for the first time. Bioshock Infinite does that.

It's 1912, and former Pinkerton agent Booker DeWitt arrives in Columbia, a city in the sky, to rescue Elizabeth, a girl trapped in a tower. You don't know why she's there (or if she needs rescuing), but, as Booker, you must stop at nothing to save her. That should be easy, right?

Wrong. Elizabeth can open portals, called Tears, that break all conventions of time and space. It's not immediately clear why she can do this, but it's not important either. The relationship between Booker and Elizabeth is the important thing, as they learn to work together and escape Columbia, taking down the

charismatic cult leader Comstock while they're at it.

During the journey the pair stumble upon Vigors, which augment Booker with powers for controlling the flow of combat. For example, is a turret giving you trouble while you're trying to take down a group of enemies? Hit it with a blast of Possession and watch it fire on its comrades.

One of the most innovative things about Columbia is the ever-present system of sky-rails encircling buildings and crisscrossing the sky. You use them to navigate the city, in and out of combat. I found the sky-rails so much fun to use that I'm afraid they'll ruin all other first-person action games for me from now on.

Although Elizabeth doesn't engage in combat, she isn't a burden—she does a decent

Set on a floating city, Bioshock Infinite blends action and intrigue.

job of hiding from enemy fire and throwing you health, ammo, or Salts (which power your Vigors). It's a nice support system. You will need her help too, as you'll be constantly scavenging for ammo or weapons. This isn't necessarily a bad thing—it keeps you from relying on one weapon throughout the game—but when you get in a bad spot, you'll have to grab the first weapon you can find. Bioshock Infinite can feel brutal and frenetic, but usually it's your own fault when you die. In my play sessions, the game rarely felt unfair.

Overall, the game refuses to talk down to the player. The narrative is a big part of what makes Bioshock Infinite special, as it seems to recog-

nize that you don't need everything to be spelled out for you—it simply offers moments of drama and lets you interpret them.

Bottom Line

That respect for the player pays off: Playing Bioshock Infinite is more satisfying and personal than playing many contemporary first-person shooters. Bioshock Infinite spins a tale of high-flying action and intrigue without relying on shock-and-awe tactics, opting instead for narrative subtlety that left me sitting in silence trying to process what happened as the credits rolled. It's not one to miss. —Alex Rubens

★★★★★; \$60; 2K Games; go.pcworld.com/bioinfinite

Aegis Bio Secures Data With a Finger Scanner

WHEN PROPERLY implemented, as Apricorn has done with its Aegis Bio 1TB USB hard drive, finger scanning is the quickest way to unlock secure storage. No messing around with a keypad—just a simple swipe, and you're in. And you can use it with any device that has a USB port and understands storage.

The USB 3.0 Aegis Bio has an integrated cable and a sealed enclosure. Three lights blink or glow to show the drive's status: locked, ready for fingerprint enrollment, unlocked, and so on. You must



Apricorn's finger-scanner drive.

enroll a finger before you can access the Aegis Bio. You may enroll up to five fingers belonging to yourself or differ-

ent people, but make sure to include at least one from each hand for extra security.

My hard-drive-based model (Apricorn sells SSD versions too) vibrated more than I preferred. Otherwise its performance was mostly top-notch: It read our 10GB mix of files at 212.9 MBps, and it read a single 10GB file at 243.2 MBps. Though it wrote the 10GB file at 107.5 MBps, it wrote the 10GB mix of files at only 22.8 MBps. The 10GB mix is a stress test that you're not likely to face often, but the Aegis Bio's slow result here is puzzling.

While the Aegis Bio utilizes 256-bit AES-XTS hardware encryption, it's not certified for FIPS 140-2 (the Federal Information Processing Standard, which the U.S. government uses to accredit cryptographic modules).

The Aegis Bio is a good overall performer. It's pricier than a plain drive, of course, but if you have things you want to hide from prying eyes, the Aegis Bio is by far one of the most convenient ways to do so. —Jon L. Jacobi
★★★★☆; \$230 (1TB);
go.pcworld.com/aegisbio

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Samsung EX2F Offers Performance and Wi-Fi

OUTFITTED WITH A super-fast f/1.4, 3.3X (24–80mm) wide-angle zoom lens and built-in Wi-Fi, Samsung's EX2F advanced compact camera should appeal to a wide range of photographers.

The EX2F has no built-in viewfinder and no optional electronic viewfinder, but the camera's 3-inch, fully articulated AMOLED screen excels in almost all lighting conditions.

External controls include both a shooting-mode dial and a drive-mode dial. These

dual dials are a great idea, but they're a bit stiff; at least you have no chance of changing settings accidentally.

Additional features include bracketing (exposure or white balance), scene modes, and creative modes. The Wi-Fi features, for image transfer, are generally easy to use.

Overall performance is good, with fast startup and little shutter lag. Shot-to-shot time is respectable, even when you're firing the flash. The autofocus sometimes



The EX2F has a fast lens.

struggles in low light and in low-contrast scenes, however.

Although the EX2F has both Raw and Raw+JPEG modes, continuous shooting is limited to JPEGs. Burst modes include 3 fps, 5 fps, and 10 fps.

Movies are captured in MP4 (AVCHD) format, up to full HD (1920 by 1080). Video image quality is pretty good, and you can apply Smart Filters to

make some creative effects.

I was pleased with most of my test still shots. Exposures were generally accurate, and colors were well saturated but attractive. Some photos seemed a little oversharpened; overall, however, images were sharp and had good detail. —*Theano Nikitas*

★★★★☆; \$349; Samsung; go.pcworld.com/ex2f

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Nikon Coolpix P7700: Good Speed, Great Images

THE NIKON COOLPIX P7700 advanced compact camera has an f/2-4, 7.1X zoom lens with a reach of 28–200mm (35mm equivalent).

The high-res (920,000-dot), 3-inch LCD is bright and clear, and fully articulated for easy shooting from any angle.

Advanced options include the ability to select a color temperature instead of a preset. The P7700 also has a built-in neutral density filter. Raw shooting is available too, as are white balance

and exposure bracketing.

Startup is pretty snappy. Autofocus is most responsive when you have plenty of light

and good contrast between subjects. The shot-to-shot time is average, but the camera seemed ready to shoot whenever I needed it to.

Carrying a 12-megapixel

The P7700 is solidly built.

CMOS sensor, the P7700 can take full HD video at 1920 by 1080 and 30 fps. Video exposures in daylight are generally accurate, as are colors.

Still-image quality is its strong suit. Under most conditions, it produced nicely saturated but natural-looking colors with crisp, clean details and only the occasional hint of overexposure. And dynamic range is better than expected, even without Nikon's D-Lighting, on high-contrast scenes. —*Theano Nikitas*

★★★★☆; \$500; Nikon;
go.pcworld.com/nikonp7700



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Make Your Point Visually With Evernote's Skitch

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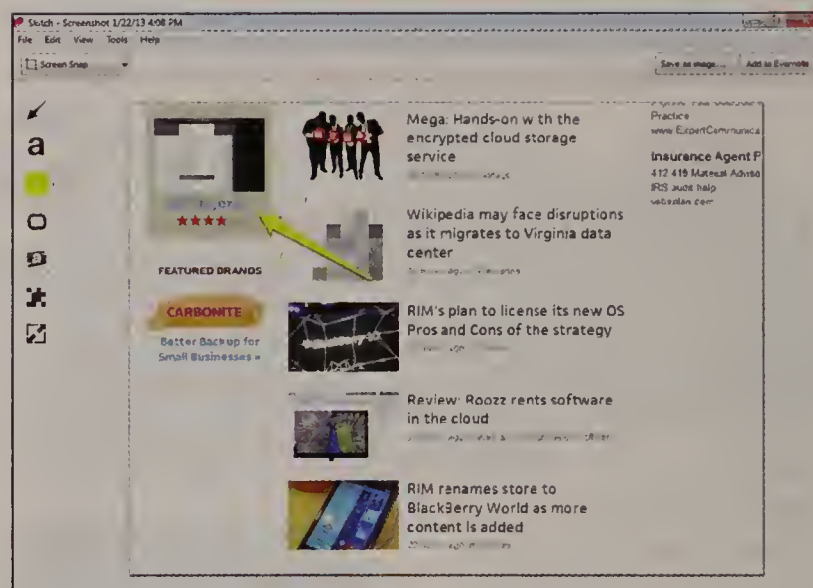


WHEN YOU'RE STANDING next to someone, pointing something out is as easy as lifting a finger or nodding. But on the Internet, this sort of fast visual communication is difficult. The free Skitch, from Evernote, can restore the visual element to remote communication.

Skitch makes it easy to take screenshots and annotate them (or any image). Skitch keeps things simple and coherent. It starts quickly, and it has just seven traditional tools: an arrow, a text tool, a color picker with eight hues, a rectangle, a highlighter, a "pixelizer" for blurring details, and a crop tool. That's it—no special effects, no filters, and nothing that will make your image look as if it were taken with a broken Polaroid in 1972.

One interesting widget is a tab at the bottom that says 'Drag Me'. When you comply, you get a local copy of the file. It's a fuss-free way to save your work or to attach the file to email.

The only criticism I can level at Skitch is that it works hard to



Skitch gives you seven basic tools for easy image annotation.

get you to use Evernote. Yes, the integration makes sense, and being able to save images to Evernote is nice, but that requires you to install the Evernote client for Windows. When you try to close Skitch without saving, the prompt allows you to abort (keep the app open), discard your work, or save it to Evernote. To save locally, you must do so within Skitch, before you close it.

Generally speaking, however, Skitch is fun and simple to use. Effective visual communication, accomplished. —Erez Zukerman

★★★★☆; free; Evernote; go.pcworld.com/skitchrev



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BleachBit Offers Comprehensive Cleaning

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CCLEANER AND PC Decrapifier are among the best system cleaners available, but they aren't entirely free to use in a professional setting. One interesting option is the open-source, cross-platform BleachBit.

The interface lists items in categories such as Flash, Google Chrome, Microsoft Office, and System. A Deep Scan option tracks down junk strewn all over the disk. The program's quick explanations assume prior knowledge; for example, under Firefox, you can clean DOM Storage, a process that BleachBit says will 'Delete HTML5 cookies'. If you don't know what that means, you'll have to search the Web for answers.

After you've decided what to clean, you click the Preview button to execute a dry run and output a log of planned operations. The output is mostly a text dump of paths for temporary files and cookies. At the end is a more human-readable summary of how much space you'll recover and how many files will be deleted. The log doesn't clearly indicate which drives are affected: When I ran BleachBit, it cleaned 18.5GB of files, but it didn't specify

whether that was on my small SSD, my 2TB hard drive, or both.

Even so, for an office or for advanced home users who like to keep things clean, BleachBit is a lean alternative. —Erez Zukerman

★★★★★ ; free; Andrew Ziem; go.pcworld.com/bleachbit

Name	Active	System
Microsoft Office	☐	The system in general
Debug logs	☐	
Most recently used	☐	
Paint	☐	Clipboard: The desktop environment's and paste operations
Most recently used	☐	Custom: Delete user-specified files and

Clipboard	☒	Mark for deletion %16 C:\Users\bulk_000\Local Settings\Temp\{DF470420-29AB-483A-B5DF-389CD99DF0C7}\{75C3C9C0-6CE6-42FA-A0E9-6A0E9-658BF339124}\visualcpp_2010\vc_redist_x64.exe
Custom	☒	Delete 0 C:\Users\bulk_000\Local Settings\Temp\{DF470420-29AB-483A-B5DF-389CD99DF0C7}\{75C3C9C0-6CE6-42FA-A0E9-6A0E9-658BF339124}\visualcpp_2010\vc_redist_x64.exe
Free disk space	☐	Delete 0 C:\Users\bulk_000\Local Settings\Temp\{DF470420-29AB-483A-B5DF-389CD99DF0C7}\{75C3C9C0-6CE6-42FA-A0E9-6A0E9-658BF339124}\visualcpp_2010\vc_redist_x64.exe
Logs	☒	Mark for deletion 43MB C:\Users\bulk_000\Local Settings\Temp\{DF470420-29AB-483A-B5DF-389CD99DF0C7}\{75C3C9C0-6CE6-42FA-A0E9-6A0E9-658BF339124}\dotNetFx40_Client_x64_x64.exe
Memory dump	☒	Delete 0 C:\Users\bulk_000\Local Settings\Temp\{DF470420-29AB-483A-B5DF-389CD99DF0C7}\{75C3C9C0-6CE6-42FA-A0E9-6A0E9-658BF339124}\dotNetFx40_Client_x64_x64.exe
MUICache	☒	Delete 0 C:\Users\bulk_000\Local Settings\Temp\{DF470420-29AB-483A-B5DF-389CD99DF0C7}\{75C3C9C0-6CE6-42FA-A0E9-6A0E9-658BF339124}\dotNetFx40_Client_x64_x64.exe
Prefetch	☒	Delete 0 C:\Users\bulk_000\Local Settings\Temp\{DF470420-29AB-483A-B5DF-389CD99DF0C7}\{75C3C9C0-6CE6-42FA-A0E9-6A0E9-658BF339124}\dotNetFx40_Client_x64_x64.exe
Recycle bin	☒	Mark for deletion 10.3KB C:\Users\bulk_000\Local Settings\Temp\{DF470420-29AB-483A-B5DF-389CD99DF0C7}\{75C3C9C0-6CE6-42FA-A0E9-6A0E9-658BF339124}\dotNetFx40_Client_x64_x64.exe
Temporary files	☒	Mark for deletion 0 C:\Users\bulk_000\Local Settings\Temp\{DF470420-29AB-483A-B5DF-389CD99DF0C7}\{75C3C9C0-6CE6-42FA-A0E9-6A0E9-658BF339124}\dotNetFx40_Client_x64_x64.exe
Update uninstallers	☒	Mark for deletion 0 C:\Users\bulk_000\Local Settings\Temp\{DF470420-29AB-483A-B5DF-389CD99DF0C7}\{75C3C9C0-6CE6-42FA-A0E9-6A0E9-658BF339124}\dotNetFx40_Client_x64_x64.exe

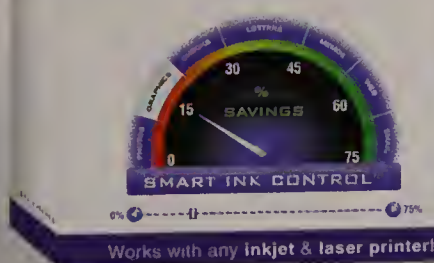
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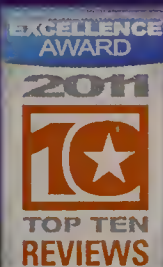
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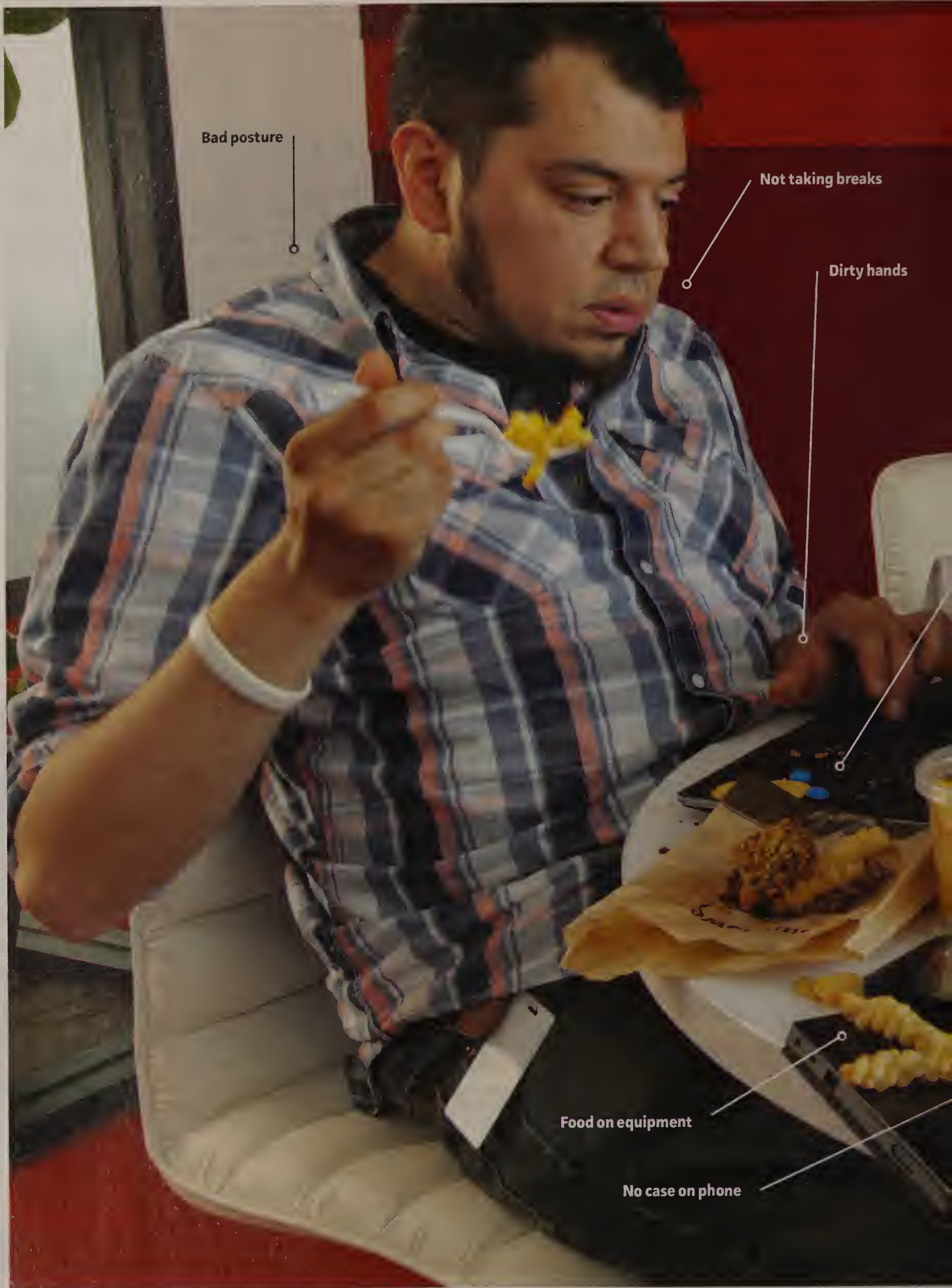
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Not taking breaks

Dirty hands

Food on equipment

No case on phone



Not cleaning equipment

The 21 Worst Tech Habits, and How to Break Them

A bad habit can ruin your digital life just as easily as it can harm your offline one. Here are the worst offenders, and how to overcome them. »

BY CHRISTOPHER NULL
PHOTOGRAPHS BY ROBERT CARDIN

Nail biting. Keeping a sloppy workspace. Habitually being late.

We all have bad habits in real life. Why isn't technology a cure for them? While tech should be a panacea for our bad habits, all too often it makes things worse instead of better. Rather than offering an easy way for us to correct something we're doing wrong, tech gives us another venue in which to engage in poor behavior.

Are you guilty of a bad tech habit? Here are 21 of the worst such technology-oriented habits, plus potential fixes for all of them.

1

Leaving Equipment in Plain Sight

The typical gadget theft doesn't happen with careful stakeouts and planning. It's conceived and executed in seconds, and probably because you left the item unattended. That cozy window corner at the café is great until you need to run back to the counter for a refill. A thief can pop in, grab your device, and be gone. Gadgetry is also commonly snapped up from airport security conveyers (sadly, sometimes by TSA agents themselves) while you're waiting for your body scan. Your locked car isn't safe, either: An eager crook will happily smash your window and grab the laptop bag from the passenger seat, even in broad daylight.

Fix: Don't leave laptops and other gadgets unattended. Yes, that means you must either take them to the bathroom or leave them with someone you trust. At a café, it doesn't hurt to ask the staff if you can leave something behind the counter for a minute. In any case, skip asking, "Can you watch this for me?" and pointing at your PC across the room.

2

Oblivious Gadget Usage

Here's how street hoods steal your phone. They lurk at the top of the stairs

as you emerge from the subway, or sneak up behind you while you're lounging at an outdoor café. Either way, you have no idea they're there, because your nose is buried in your smartphone's Facebook feed. Next thing you know, you've been punched in the face, and the thieves are dashing off to a getaway car. Can you identify the suspects? No, because the last thing you saw before it happened was a picture of a puppy.

Fix: Everyone uses their phones everywhere, so it doesn't feel risky to break one out on the train or while walking home in the dark. But electronics remain some of the most easily fenced items on the black market, and it pays to keep your wits about you when using them in an unknown situation. Make it a policy to limit mobile device usage to areas where you're completely certain you won't be the victim of a smash-and-grab attack. That goes double for using your phone while you're driving. Don't become another statistic!

3

Using Your Devices With Dirty Hands

Anyone who has ever handed a cell phone to a child knows that the device will come back covered in a crust of dirt, crumbs, chocolate, and sneeze spray.

But you aren't much better. Playing



Bejeweled while downing a burrito won't leave your phone looking fresh, and holding your phone against your face to talk may leave an oily shadow behind.

This isn't just gross, but brings health risks, too: The old adage that your keyboard is dirtier than your toilet applies to your phone, as well. One report last year claimed that a Ugandan thief contracted Ebola from a stolen phone.

Fix: Keep an electronics-cleaning vial on your desk in plain view. Clean your phone, tablet, and other touchscreen devices daily; add a quick wipe-down any time you see visible grime.

4

Not Cleaning Your Equipment

We covered the problem of filthy touchscreens (increasingly problematic in the



Windows 8 era) in the #3 item, above. But what about everything else?

Literally everything in your high-tech arsenal is vulnerable to damage from dust and dirt. Grime seeps in through any crack and crevice, but machines such as desktops, laptops, and even printers, which have air-intake vents for cooling, are the most affected. Dust generally won't damage electronics, but it can clog fans, optical-drive mechanisms, and other moving parts, which can lead to component failures and overheating if the fans stop working properly. Dust in scanners and printers can affect the quality of your printouts, too.

Fix: Cleaning your equipment isn't hard, but it's important to do so regularly before things build up too much. Once or twice a year should do it. Can't remember? Try cleaning out your PC at the same time you replace the filter on your fur-



SOMEONE CAN EASILY TAKE YOUR GEAR IF YOU LEAVE IT SITTING UNATTENDED.

nace or air conditioner, or whenever you get the oil on your car changed. A calendar reminder on your PC can help, too.

5

Sitting With Bad Posture at the Computer

The posture lessons, cautionary tales, and ergonomic gadgets of the past 30 years have apparently taught us nothing, and as a result, carpal tunnel syndrome is the most common form of neurological syndrome called entrapment neuropathy, affecting 5.8 percent of the population. The typical treatment, even for

moderate cases, is surgery. And all because you were too lazy to sit up straight.

Fix: Fixing this problem requires a proper work environment. Keep your chair at a height so that your knees bend at a 90-degree angle; also keep your feet flat on the floor, your monitor directly in front with the top of the screen at eye level, and your keyboard placed so your wrists are parallel with the floor.

This is easier said than done if, as it is for many, your office is now a Starbucks. But Imak Computer Gloves (go.pcworld.com/imak) can keep your wrist at the correct typing angle and cushion your hand—an easy solution that you can drop into your gadget bag. »

6

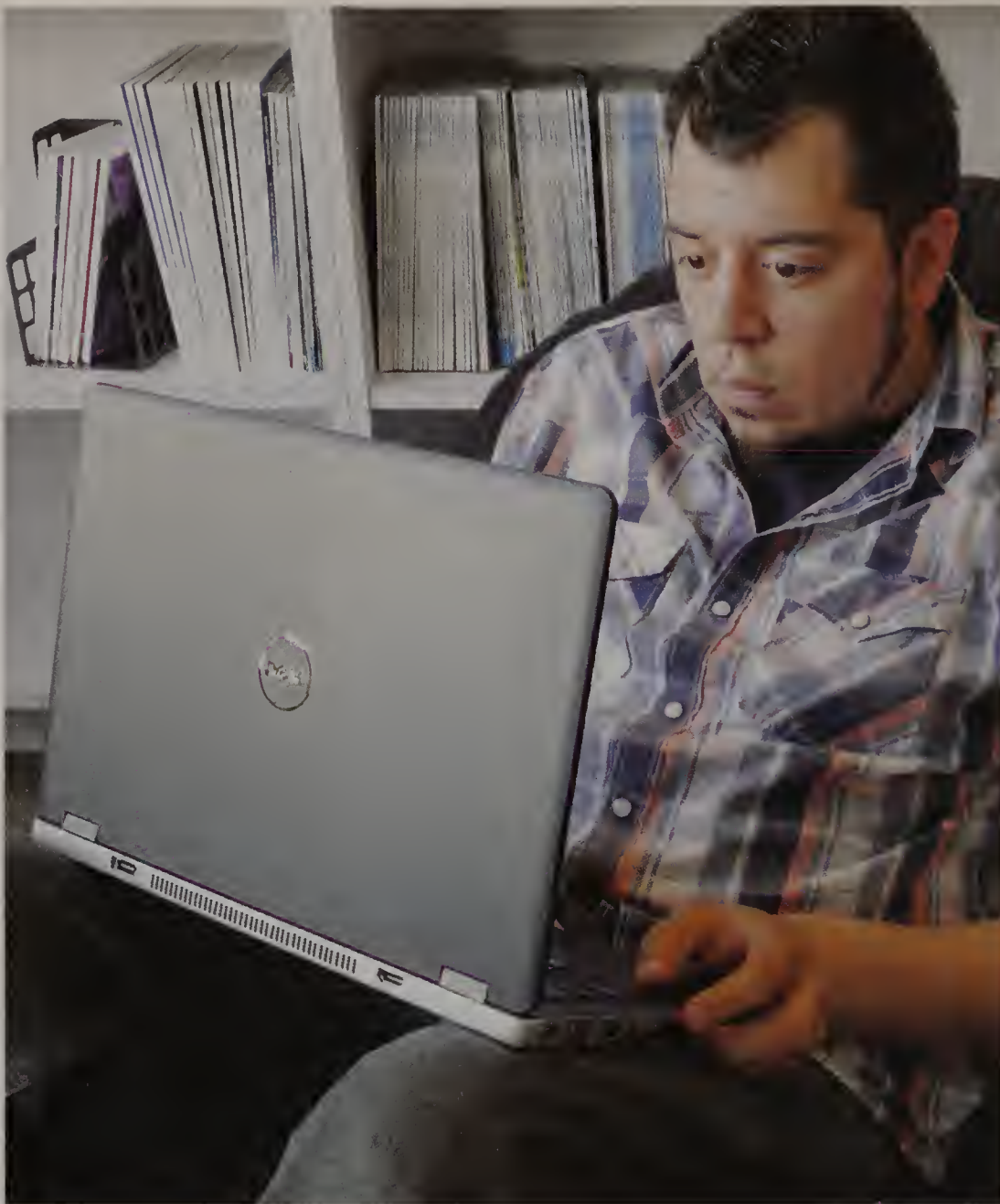
Not Taking Breaks

Most parents have no trouble limiting their children's screen time, but they find it harder to put down their laptops or smartphones when work demands action (or Angry Birds chirps).

Breaks are essential to good health. Your joints, muscular system, circulatory system, and eyes all benefit from a change of scenery once in a while. Remaining in a seated position for extended periods of time can cause blood clots (sometimes even fatal ones). And staring at a screen for hours on end can cause eyestrain that may affect your vision afterward and make it dangerous to drive home.

Fix: Fortunately, programs such as Scirocco Take a Break (go.pcworld.com/scirocco), mobile apps, and Web browser plug-ins can remind you to step away from your gadgets, stretch your legs, get a drink of water, or call it a day on your computer time.

Another easy way to remedy the problem is to keep, at all times, a very large glass of water at your desk (the solution for another bad habit: failure to hydrate).

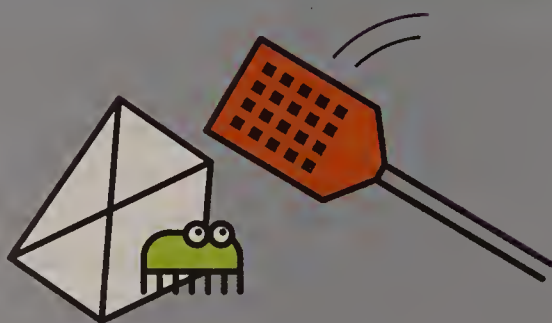


TIP

A LAPTOP ON YOUR LAP CAN MEAN BAD POSTURE AND PROBLEMS FROM ITS HEAT.

ILLUSTRATIONS: ANDERS WENNGREN

BAD EMAIL HABITS



Responding to Spam (Don't!)

There's a difference between a mailing list or a promotional newsletter you signed up for and spam. The first you can unsubscribe from—and you should, liberally—the second you cannot. Use unsubscribe links for the former and invest in a spam filter for the latter. If spam becomes such a problem that you can't manage it, consider the nuclear option: changing your email address.

Keeping a Full Inbox (Clean It Out!)

Treat your inbox like your desk, with only essentials you need at that moment. As for everything else, file it, delete it, or transfer it to the calendar. Some task management approaches favor "inbox zero" (making your inbox totally empty), but the "no-scroll" goal (all inbox contents on a single screen) is more reachable for many.



Sipping a gulp from that glass of water regularly will force you to take an occasional break to the bathroom.

7

Working With Your Laptop on Your Lap

Yes, they call it a laptop, but you weren't supposed to take that literally. Using your laptop on your lap can lead to a whole host of problems, many caused by the heat that most laptops spew from their undersides. The maladies can range from simple skin dryness and discoloration to reduced sperm count to—the jury's still out on this one—cancer.

Heat isn't the only problem. Placing a heavy object across your thighs for hours on end can cause neurological damage, particularly when coupled with the typical laptop-on-lap posture: hunched over, legs outstretched, neck craned. Arthritis can also develop over time.

Fix: Fixes aren't easy unless you want to move your desk into the living room so you can watch *Game of Thrones* while you work. Instead, start with a lap desk that shields your thighs from heat, and

follow the break-taking tips outlined in item #6. Periodically shifting your laptop from one leg to the other can help. Avoid working on your laptop with your legs outstretched on the coffee table, too. Your nervous and muscular systems will be in better alignment if you keep your knees bent and your feet on the floor.

8

Failing to Back Up Data

Stop me if you've heard this one before. Everything is zipping along just swimmingly until one day it suddenly isn't. Maybe it's a hard-drive crash, maybe it's a malware infestation, maybe it's a stolen laptop. One way or another, your data has abruptly vanished, and you're left crying that you should have been backing up your data.

The excuses for not backing up your data are becoming increasingly thin. Any number of online backup services will sync your files automatically with a cloud-storage system, whether you use a PC, a tablet, or a phone. Don't be lulled into thinking that you have nothing important on that device. Whether it's a

forgotten baby picture or a game save on the verge of hitting 100 percent completion, you'll feel differently once it's gone.

Fix: With most backup systems now, you don't need to do anything except install an app and set it up. If that's too much effort, well, perhaps it's time to go back to pen and paper.

9

Reusing Passwords Over and Over

We are all guilty when it comes to this bad habit. How are you supposed to remember your 100th different password for the latest social network you've joined? You take the easy way out and reuse a password that has worked for you time and time again.

Password "strength" is a bit illusory. All it takes is one website that doesn't store passwords securely and gets hacked, or one old and unencrypted hard drive that's sloppily disposed of, to bring the whole house of cards tumbling down, no matter how many numbers, uppercase letters, and special characters you use.

Fix: The solution involves coming >>



Answering Instantly (Think First!)

It's tempting to write back to an email as quickly as possible so you can get it off your plate (and out of your inbox), but doing that can create its own problems. Consider setting your email client to delay its send/receive operation by 10 or 15 minutes. This gives you the

chance to edit a message, add something to it (so that there is no second message, thereby keeping down the overall number of messages that you're sending), and avoid the "I accidentally hit the Send button" goof-up. More critically, a delay lets the recipient know you took time to put together a thoughtful reply.



Replying to All (Stop!)

One reason our inboxes are so full: We send so much email. Bob sends an email to a dozen people because he doesn't know who can help him solve a problem—and those dozen people then reply to everyone. Use 'Reply to All' sparingly, and be certain every recipient on an email thread needs to read your response.

up with a system to build a unique password based on each website where you use it. Build from a base phrase and add something unique to it for each site. Take, say, *Flurpb&rgl3r* as a base and add *fb8* to the end for Facebook, or *tw7* for Twitter. (In this example, the numerical component of the end tag is the number of characters that the site name has.)

Presto: a password that you won't forget but is virtually impossible to crack.

10

One Account, Multiple Users

A parent's typical move, when giving a child his or her first computer, is to hand it over and hope for the best. Mom then wonders where her address book went, and her boss wonders why she sent him

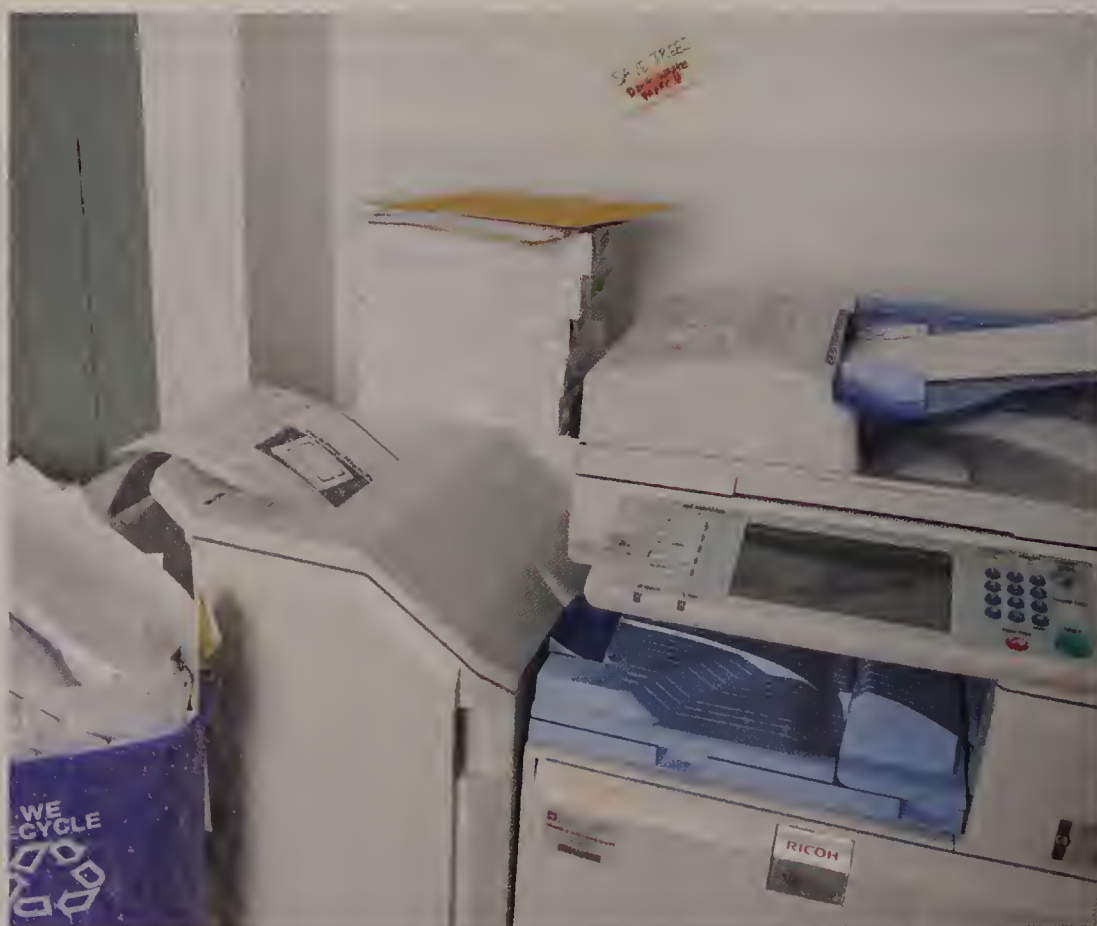
20 email messages full of gibberish.

Fix: Setting up multiple user accounts on Windows isn't difficult, and it's an incredibly prudent precaution if more than one person is going to use the machine. Never mind the privacy issues—accidents happen, even among grown-ups sharing a PC. Having two people working on different files called "resume.doc" can only end in heartache.

For children, security and safety are bigger concerns. Setting up kids with Standard User accounts (instead of Administrator) is the wise thing to do to keep unwanted software from being installed, and it's the key to letting you configure parental controls on the computer, as well. So next time Junior wants to use your PC "real quick, just to look something up," tell him sure, and give him his own account.

TIP

SAVE PAPER AND DON'T PRINT ANYTHING.
YOUR DOCUMENTS ARE ARCHIVED ONLINE.



11

Failing to Update

Software published today is updated on a near-constant schedule. If you have a few dozen apps on your smartphone or tablet, you've probably become accustomed to downloading updates on a daily basis—unless you're one of those people who never update anything.

Software updates are released for a variety of reasons. The application's developers add features, fix bugs, and plug security holes. Installing updates upon release—particularly operating system updates and security software updates—is essential to keeping your device stable and secure.

Fix: Every application has to be updated, so it's forgivable if you don't want to deal with the constant nagging to install, reboot, and repeat every day. Automatic updates take some of the hassle out of this operation, but most software updates today still have to be manually installed. There's no easy solution to this. If immediately installing updates when they appear in the system tray or on your handset doesn't fit with your computing habits, make it a weekly event to update everything all at once—perhaps after you take out the trash.

12

Printing Anything

You've seen the request at the bottom of so many email messages: "Please consider the environment before printing this email." Is that really necessary in 2013? Who is not considering the environment? And more important, who is still printing out their email?

In an age of \$75 terabyte hard drives and endless cloud storage, why does anything that starts out in digital format, such as email, ever need to go back to paper? Even utility and bank statements are archived online (often for years),

much safer as backups than the ones sitting in file cabinets in your house.

What legitimately needs to be printed? The only thing I can come up with is mailing labels for products that have to be physically shipped somewhere, and maybe the packing slips or receipts that are included with those packages. Also arguably acceptable is the occasional printed photograph that you'd like to frame and put on the wall.

Fix: Unplug your printer and stick it in a closet for a week. See if you can't go paperless, cold turkey.

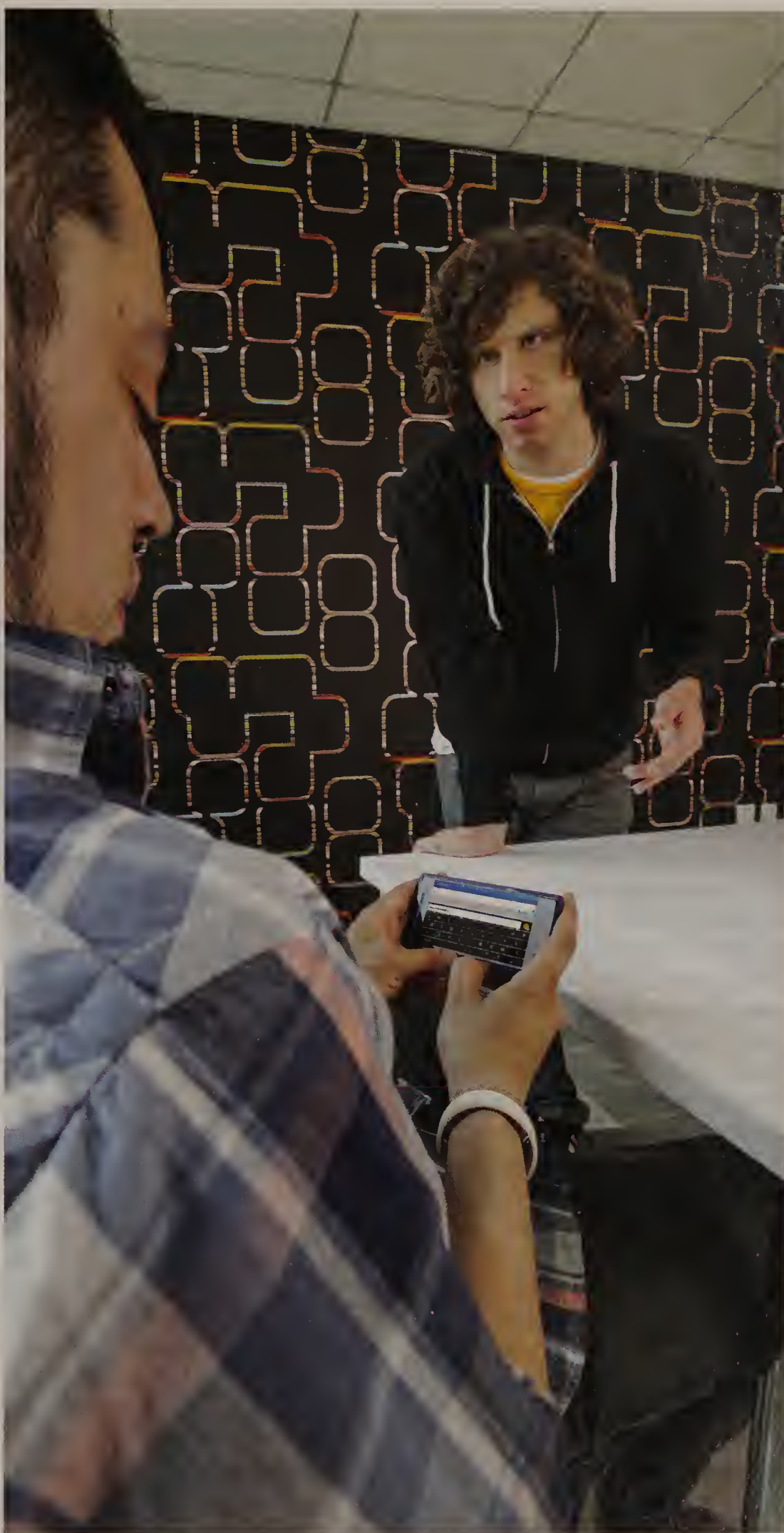
13

Faxing, Ever

As bad a habit as printing is, faxing is infinitely worse. Here, you have the opportunity to break the paper cycle, but instead you're continuing it, indeed worsening it by duplicating the paper and possibly racking up long-distance telephone charges in the process.

No disrespect to the fax machine. It was a critical piece of apparatus in American business for years, but now it is an outdated relic on a par with the dial-up modem. Yes, technology has improved—you can even send color faxes now—but quality really has not. Most faxed documents are still difficult to read, still come out askew, and are often incomplete, cut off by a paper jam or a problem with the phone line. Many people resort to faxes when they need to send a signed document to another party, but in many cases a fax with a signature may not even be legally acceptable.

Fix: Fortunately, for most people, faxing is a fairly easy habit to break. Just staring at the pile of junk faxes that most businesses continue to receive is impetus enough. While your fax machine may be attached to an otherwise useful all-in-one printer, you can simply unplug it from the phone line, and save a few bucks a month if you're paying for a second line >>



TIP

TEXTING AT THE TABLE WHEN SOMEONE IS TALKING TO YOU SHOULD BE A NO-NO.

for it. Plenty of free or cheap services can let you send a digital fax, should you really need to do so.

14

Throwing Computer Equipment in the Trash

If you've been a computer user for any length of time, you've probably accumulated dozens of old peripherals, outdated or broken laptops, ancient cell phones, and gobs of cables. What do you do with that mountain of telephone wire that came with every modem you ever bought? What about all those old red-white-and-yellow A/V cables bundled with the VCRs of yesteryear?

Much of this material unfortunately ends up in landfills. Some, like telephone wire, isn't exactly hazardous, but anything with a battery or a circuit board in it probably is. (Modern electronics typically aren't as toxic as older stuff, but that isn't what you're throwing away, is it?)

Fix: The good news is that you can fairly easily recycle most of this junk, even broken cables and defunct printers. E-waste events are common in many neighborhoods, and both Goodwill and Best Buy will take just about anything off your hands for reuse, resale, or recycling.

Don't forget to scrub personal data from any hard drive or flash drive you recycle. Use a multipass wiping tool such as BCWipe (go.pcworld.com/bcwipe) to make sure last year's tax returns don't end up in someone else's hands.

15

Not Reading the FAQs

When trouble arises online—as it always does—the knee-jerk reaction is to open a support ticket or call the help desk immediately. Then you'll spend half an hour on hold waiting for someone who probably can't do much to help you.



TIP

A BLANKET POLICY OF IGNORING YOUR INCOMING CALLS MAY NOT MAKE SENSE.

Fix: Make it a habit to remember the FAQs. Companies love to create Frequently Asked Questions pages because they really do answer a lot of common concerns. While some FAQs are more thorough than others, they're always worth a quick spin to see if you can't find a quick answer to what you believe is a unique problem. Use the search feature on your browser to scan a large document for your trouble keywords.

most is the one who does the blathering.

Fix: If you're at all concerned about your appearance in the world, try to keep comments unique and unexpected. Dutifully copying the latest "Follow these instructions or else!" post on Facebook is no better than mailing chain letters to all your friends. Restrict social media chatter to a few posts a day. You can post the rest of your conspiracy theories ad nauseam to your blog.

16

Oversharing on Social Media

It's good news that you finally resolved your bunion problems. We got a kick out of that picture of the syrup puddle on your breakfast waffles. And the story about the squeaky dog toy you bought was also a gem.

Yes, complaining about banal stories, photos, and comments on Facebook and other social media sites has become a First World Problem of the greatest order, but considering how intertwined social media and the business world have become, the person likely to suffer the

17

Texting at the Table

Really? It's that important? We all love our smartphones, but using them in the company of others, particularly at mealtime, is just plain rude. (It's also gross. See item #3.)

What about the phone-in-the-lap trick? Not kosher. Even Emily Post says so. And that goes for any kind of social situation, whether it's school, work, or a simple conversation with someone else.

Fix: If you must deal with another conversation, voice- or text-based, take it to another room or outside. And be sure to



make the “no phones at the table” rule apply to everyone in your household, including yourself.

18

Using Your Phone or Tablet Without a Case

How will it end? Eventually your phone or tablet will die. The battery may explode. The CPU may melt down. Cosmic rays may fry the RAM. But realistically, you will probably just drop it.

No matter how sure-handed you are, and no matter how carefully you treat your devices, one day they are going to slip out of a pocket, or simply fall to the ground when someone’s elbow bumps against you.

Fix: The only solution is to enshroud your gadgets in cases—thick, sturdy ones. The flippy Smart Cover for your iPad is useless when a preteen fumbles it to the tile. Go for a thick rubber or silicone case that covers every corner of the device, such as the Otterbox Defender. A thinner, plastic case may do the job, but replace it when it becomes damaged.

19

Failing to Pick Up the Phone

The phone rings. You look at the number and don’t recognize it. You let it go to voicemail, and that little red light blinks all day until you finally get around to playing the message.

Technology has given us a half-dozen ways to communicate with one another—virtually all at the expense of the fastest and most expedient, the telephone. It’s easy to understand why we don’t answer the phone anymore: We likely don’t want to talk to a solicitor, a pitchman, or a robotic telemarketer.

Fix: We’re not talking about breaking the rule against texting at the table (item #17), but a blanket policy against answering the phone may not make sense. Consider how much faster it would be to answer a simple question via voice than to read and respond to a long email message. Imagine that your \$500-an-hour attorney is the one who is calling. Do you really want to force him to spend 10 minutes writing an email to you when he could have told you something on the phone in 30 seconds?

20

Failing to Silence Your Phone

These days, just about every public performance begins with an entreaty to the audience to mute or turn off their cell phones. Thirty minutes later, the unmistakable jingle “Marimba” makes its presence, and its clueless owner, known.

Cell phones that erupt at the most inappropriate times are a cultural epidemic, and ironically it’s likely because we have heard so many commands to shut our phones off that we simply don’t hear them at all anymore.

Fix: While you likely can’t fix the behavior of the person sitting next to you, at least you can ensure you aren’t part of the problem. Simply make your default setting “ringer off.” Turn the ringer on only when you know you’re going to need to hear it ring—that is, any time it’s not in a pocket and out of arm’s reach.

21

Never Rebooting

For all their advances in reliability, our gadgets remain incredibly susceptible to minor bugs of all kinds. Memory leaks are still rampant in Windows applications, flooding your RAM to make it unusable. Numerous applications still require reboots after they’re installed or updated, and the app will be stuck in limbo until that reboot occurs.

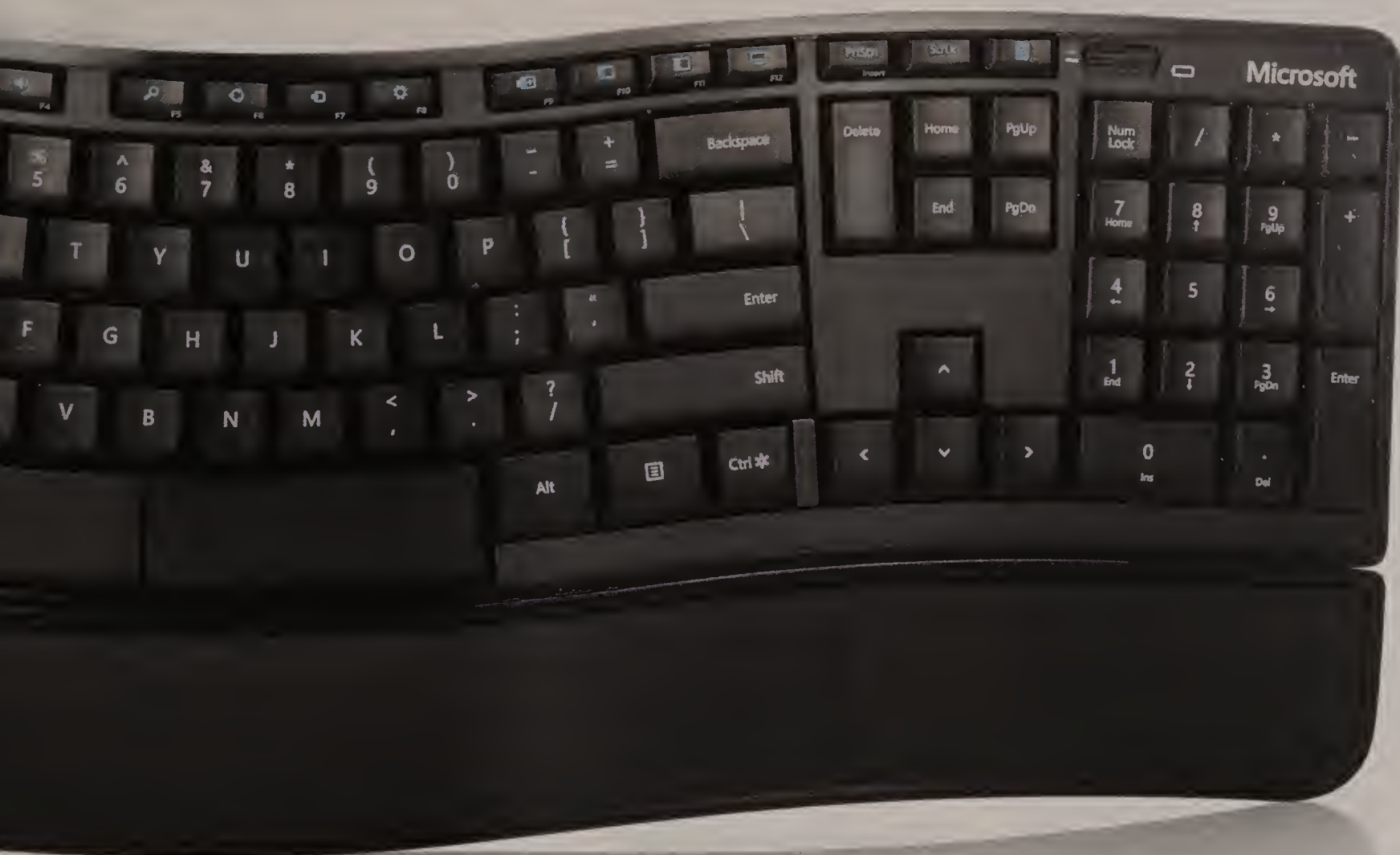
Windows 8 has improved reboot times (and reboot frequency), but every operating system—whether desktop or mobile—benefits from an occasional reboot. Think of it as a good night’s sleep for a device: A reboot lets it start fresh, free of digital baggage. A reboot may improve your device’s battery life.

Fix: Build rebooting into the natural downtime of your day, typically when you go to bed. Reboot your device to give it a refresh. Better yet, turn it off completely and save energy. ●



KEYBOARD
Microsoft
Sculpt Comfort
See page 11.

DISPLAY
Acer
T232HL
See page 76.



Touch and GO

Windows 8 is all about touch, so we got our hands on 11 next-generation input devices and three new displays designed to improve the way you use your tablet, laptop, or desktop PC. »

BY ALEX COCILOVA • PHOTOGRAPHS BY ROBERT CARDIN

STYLUS
Targus
Touch Pen
See page 76



MOUSE
Microsoft
Touch Mouse
See page 71



Although Windows 8 has a lot going on under the hood, touch control is the one feature that fundamentally alters how you interact with your laptop, tablet, or desktop PC. The change in interaction is almost as significant as the transition from relying on keyboard combinations to sliding a mouse around on your desk. These days you can control your device with a finger swipe or gesture as easily as you can with a press of a button on a mouse or keyboard. Those familiar devices aren't necessarily going away, but they are evolving to take advantage of Windows' new user interface.



Keyboards

WHILE THE ON-SCREEN keyboards of tablets might be good enough for entering logins and passwords or for typing IMs and short email, only the most masochistic user would want to produce long documents on one. We tested four new physical keyboards that work with tablets, PCs, and even smartphones.

Logitech K810 Keyboard

Pros: Comfortable, textured keys; connects to three Bluetooth devices; some key customization

Cons: Wide spacing; short-throw keys

Logitech has a reputation for making great keyboards, and the K810 is no exception. This battery-operated wireless model can connect to any Bluetooth host. If you like typing in the dark—at a desk or on your living-room sofa—you'll appreciate the backlit keys that brighten or dim in response to ambient light.

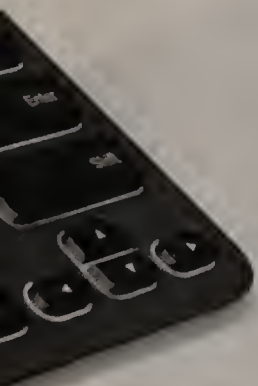
You might think the backlight would result in short battery life, but a proximity sensor switches it off when your hands aren't hovering over the keyboard. Using the on/off switch will also help (an LED embedded in the <Delete> key informs you of the battery's status). Logitech promises that a fully charged

battery will deliver 10 hours of use. (A Micro-USB charging cable comes in the box, but you get no AC adapter. You'll need to provide your own adapter or use your PC to recharge the keyboard.)

You can store up to three Bluetooth connection profiles in the K810's memory, and dedicated function keys let you switch between using it with a computer, a tablet, or a smartphone with a single press. You can be sending email on your PC at one moment, and responding to an instant message on your phone the next.

Other function keys at the top of the keyboard handle tasks such as toggling between play and pause in your favorite media player, launching the calculator app, adjusting the volume, and opening the Web browser. The K810 also sports a <Windows> key that toggles between the Windows 8 tile menu and the current active window (in Windows 7, this key opens the Start menu). Install Logitech's software on your PC, and you can customize some of the function keys.

The keyboard is extremely thin, with a slightly wedge-shaped profile, but it's comfortable to type on. The arrow keys are at the bottom edge in the familiar inverted-T formation, but you won't find the <Home>, <End>, <Page Up>, and <Page Down> constellation anywhere.



What's more troubling, especially for anyone who works with spreadsheets or accounting software, is the absence of a numeric keypad.

The keys are indented and slightly textured so that your fingertips don't slip off, but they're more widely spaced than we're accustomed to, and we needed some time to adapt and type accurately. Gamers won't like the short-throw keys because it doesn't take much resting weight to depress them accidentally.

Logitech charges \$100 for the K810, but the keyboard's feature set and performance render it worthy of that premium price tag. ★★★★★; \$100
go.pcworld.com/logitechk810

Microsoft Sculpt Comfort Keyboard

Pros: Comfortable features; Windows 8 function keys

Cons: No backlight; double-wide spacebar split into two pieces

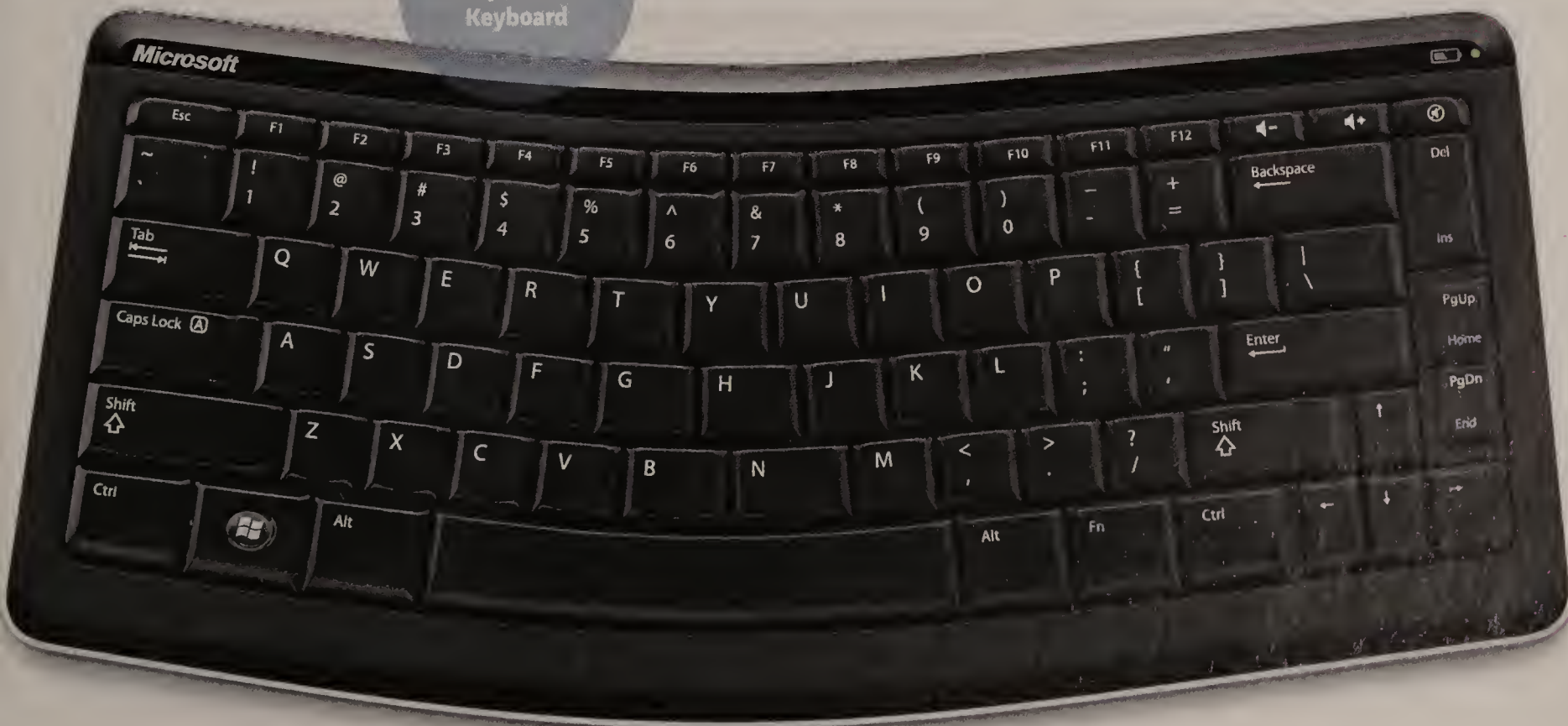
Given that ergonomics is the science of designing

equipment to fit the human body, you might think that all ergonomic keyboards should look and feel the same. In reality, every manufacturer seems to have a different opinion on what makes a keyboard suitable for human hands. Microsoft's take is that the keyboard should have subtle curves and plenty of padding.

Being accustomed to pounding on decidedly nonergonomic straight planks, we were skeptical of the \$60 Sculpt Comfort's shape and pillow-top accoutrements. But it didn't take long for us to come around. Legs underneath the keyboard lift the base up so that your wrists, or the edges of your palms, can rest on the padded surface (you can detach the piece if it cramps your style).

The contoured lines the keys follow aren't so exaggerated that you'll feel the need to go back to Typing 101. Our fingers fell naturally on the home row, and that let us straighten our wrists instead of contorting them to comply with a standard row. The keys travel much deeper into the well—which some people will like and some will hate—but they do their thing quietly.

Microsoft
Sculpt Mobile
Keyboard



HOW WE TESTED

WE CONNECTED EACH of the input devices in this article to an HP Spectre XT TouchSmart 15t-4000 Ultrabook and performed a series of everyday tasks, including launching programs, exploring folders, reading and writing documents and email, editing digital photographs, and surfing the Web. We judged the products based on ease of installation and setup, ergonomic considerations, comfort, the degree to which promised features were executed, and—where appropriate—how portable the device is for use on the road.

We downloaded and installed the most current drivers from each manufacturer's website. To evaluate the Targus Touch Pen, we disabled the TouchSmart's touchscreen.

For some reason, Microsoft's engineers thought it would be a grand idea to make the spacebar twice as wide as the other keys, split it in two, and assign backspace functionality to the left portion. The design seems intended to ➤



Microsoft
Wedge Mobile
Keyboard

make deleting typos easier—your right hand doesn't need to leave the home row so your pinky can reach the conventional backspace key—but as touch typists, we found the practice of using our thumbs for nothing but pressing the spacebar just too deeply ingrained. Fortunately, you can easily turn the left spacebar into a normal spacebar again.

The Sculpt Comfort has Windows 8 shortcut keys for opening the Search, Share, Devices, and Settings charms, and 'Undo', 'Cut', 'Copy', 'New', and 'Open' are printed on the Z, X, C, N, and O keys, respectively (in case your muscles haven't memorized the <Ctrl>-plus combos). This keyboard doesn't have the fancy back-lighting that Logitech's K810 boasts, however, and although it is wireless, it requires disposable AA batteries and an oversize dongle plugged into the host. Even so, it's priced right. ★★★★★; \$60
go.pcworld.com/sculptcomfort

Microsoft Sculpt Mobile Keyboard

Pros: Full-size keys, Windows 8 function keys, Bluetooth connection

Cons: Shallow keys, uncomfortably flat

Microsoft packaged its ergonomic concepts in a take-it-with-you model in the form of the Sculpt Mobile Keyboard. This \$50 plank offers the same contoured shape of the Sculpt Comfort in a smaller, thinner, and lighter package, losing the padded wrist rest and the numeric key-

pad in the process. It slides easily into a messenger bag or backpack along with a Windows tablet or laptop (the host machine must have Bluetooth).

The keys are full size, but the keyboard is so thin that they have almost no well to travel down into. The Sculpt Mobile's nearly flat design makes it awkward to use. Typing on this keyboard felt like tapping a two-by-four. We'd almost rather use an on-screen keyboard.

If the shallow key travel doesn't bother you, the Sculpt Mobile may appeal to you since it has the same Windows 8 features that we like in the Sculpt Comfort: You'll find keys for the Search, Share, Devices, and Settings charms, plus a function key that cycles through open apps, and another that docks the currently active app to the left or right side of the display. Pressing the <Windows> key toggles between the Start screen and whatever app you're currently using.

Microsoft promises ten months of life from two AAA batteries, and the keyboard has an on/off switch and a battery-life indicator, but we'd prefer rechargeable batteries that won't wind up in a landfill quite as soon. ★★★☆☆; \$50
go.pcworld.com/sculptmobile

Microsoft Wedge Mobile Keyboard

Pros: Portable; Windows 8 function keys; cover doubles as a tablet stand

Cons: Cramped; flat, shallow keys; pricey

Besides its more traditional, straight design, two other features separate the \$80 Wedge Mobile from the Sculpt Mobile. The first is the lightweight, snap-on carrying case, which can act as a stand for your tablet whether it's a Windows slate, an Android model, or an iPad. The second is its extremely small size, 10.1 by 3.97 inches (versus the 13.9-by-6.54-inch Sculpt Mobile). Another cool thing: Replacing the cover turns the keyboard off, preserving its battery life.

The Wedge Mobile's rubberized case provides protection for the keyboard, and it makes a surprisingly robust tablet stand. It can maintain the tablet in only one position, but we didn't have a problem with that. We did have issues using the keyboard, whose key well is even shallower than the Sculpt Mobile's. The keys are packed too tightly together, and they lack texture. Those problems, combined with the weak tactile feedback, had our fingertips bumping into one another as if they were performing at a poorly choreographed dance recital.

Like Microsoft's other new keyboards, the Wedge has keys for media-player software, volume, and Windows 8 charms (Search, Share, Devices, and Settings).

Microsoft seems to believe that the Wedge Mobile's dual functionality makes this keyboard/stand combination worthy of a premium price tag. We don't. ★★★☆☆; \$80
go.pcworld.com/wedgemobile

Mice

IF YOU THINK touchscreen displays are destined to render the mouse extinct in the near future, you haven't seen the innovative designs that peripherals manufacturers have come up with lately. Although we have yet to see any new mouse models that are particularly suitable for gaming, some of the five rodents we tested would make great companions for Windows 8.

Logitech Touch Mouse T620

Pros: Comfortable size and surface; helpful Windows 8 gestures

Cons: Lacks gesture customization; some gestures are tough to perform; slippery

If interesting industrial design were the only criterion in this competition, Logitech's pricey Touch Mouse T620 (\$70) would carry the day with its fascinating patterns. Stroking the surface of this touch-sensitive, egg-shaped device with your fingertips when it's connected to a Windows 8 computer or device is supposed to have the same effect as performing gestures directly on a touchscreen monitor. Unfortunately, it didn't always work that way in our experience.

Gestures include swiping one fingertip in from the left edge to switch between applications, or from the right edge to open the Windows 8 charm panel. Swiping left and right with one finger activates horizontal scrolling, but performing the same movement with two fingers is supposed to move backward and forward in the Web browser's history. You can also perform left and right button clicks with one finger, but you need to place two fingers on the lower two-thirds of the T620's surface to perform a middle-button click and toggle between the Windows 8 Start screen and the desktop.

We encountered a difficult learning curve as we sought to master the T620. The surface of the mouse is so smooth and devoid of texture that it slipped out of our grip on several occasions. The surface has no definitive markings to identify the precise area you're supposed to interact with, and the buttons have no seams. Sometimes our gestures worked fine, but almost as often we looked like kooks as we repeatedly tapped and stroked the device, anxiously trying to bend it to our will.

You need to plug a tiny dongle into the host's USB port to pair the mouse to it. Logitech includes a software program that provides a limited degree of customization: You can use checkboxes and drop-down menus to match predefined gestures to certain predefined outcomes, but you can't create macros or anything elaborate.

In the final analysis, Logitech's Touch Mouse T620 is an interesting misfire. ★★☆☆☆; \$70
go.pcworld.com/logitechT620



Logitech Zone Touch T400

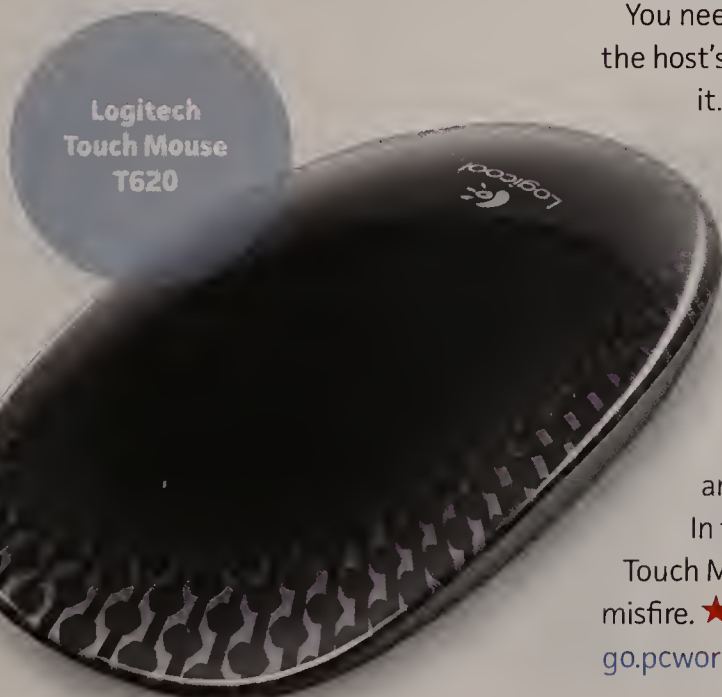
Pros: Dual middle mouse buttons; customizable buttons

Cons: USB powered; uncomfortably thin

The \$50 Zone Touch T400 is slightly more conventional than the all-surface T620. Its left and right buttons are just as seamless as those on its cousin, but here Logitech has replaced the middle button with a glass touch strip. Tapping the top two-thirds of the strip takes you to the Windows 8 Start screen, while tapping the bottom third opens a window that allows you to switch applications. Stroking your finger left or right across the strip scrolls the active window in whatever direction you move. Performing the same action in a Web browser takes you forward and backward through its history. Sliding your finger up and down the strip scrolls vertically.

You can customize these actions in Logitech's SetPoint software to a limited extent. We promptly reversed the middle strip's area assignments, because that arrangement seemed more logical to us. But as we discovered with Logitech's T620, customizations on the T400 are restricted to predefined choices—you can't create custom macros or any other special setups like that.

We like the feel of the matte finish atop the T400, and the device's rubber-coated sides are easy to grip. Nevertheless, the mouse is too small for anyone with even average-size hands. View the demonstration videos on Logitech's >>



website (go.pcworld.com/t400gestures) to see for yourself: The clips show a woman's hand completely covering the mouse as she operates the buttons. We hadn't been using the mouse for more than an hour before our hands each curled into a painful claw.

Mice have had tilt wheels between their left and right buttons for years, but although many users spin such wheels constantly for vertical scrolling, they almost never tilt them to scroll horizontally. We wouldn't perform the left/right stroke motions on the T400 any more frequently. And a wheel is a more effective tool for vertical scrolling, regardless.

★★★★☆; \$50

go.pcworld.com/logitech400

Microsoft Touch Mouse

Pros: Comfortable textured surface; easy-to-master gesture controls

Cons: Some gestures result in misclicks; USB instead of Bluetooth

After auditioning Logitech's offerings, we were almost ready to give up on the touch-mouse concept entirely, but Microsoft's Touch Mouse quickly changed our mind. This model's \$80 price tag, on the other hand, is a little hard to swallow. The Touch Mouse has a few limitations, too: It works only with computers or tablets running Windows

7 or Windows 8, and it requires a USB port to host its tiny wireless dongle.

The Touch Mouse can distinguish between gestures performed with one, two, or three fingers on its top surface, and it can execute other commands in response to thumb gestures made on its side. Simply flick one finger to the left or right to scroll in the corresponding direction. Slide two fingers to the right to switch to your next open application, or slide them left to open the Windows 8 charm bar. Sliding three fingers down the mouse zooms in, and sliding three fingers up zooms out. Finally, sliding your thumb left or right takes you backward or forward in a Web browser or a slideshow.

You can perform other commands, as well, and although it takes some time to master the strokes without accidentally depressing the left and right mouse buttons, you won't want to go back to a conventional mouse once you have. We'd probably continue to use on-screen tools for some commands (such as zoom), but if you like gestures, Microsoft's software allows you to customize the actions to your heart's content; we changed the three-finger action to call up the search function, for instance. The Touch Mouse is touch done right. ★★★★★; \$80

go.pcworld.com/mstouchmouse

Microsoft Sculpt Touch Mouse

Pros: Tactile feedback; comfortable shape combined with a compact size; Bluetooth connection

Cons: Middle touchpad's responsiveness results in some misclicks

The best peripherals are easy to operate and comfortable to hold. Microsoft's \$50 Sculpt Touch Mouse offers three simple buttons and a comfortable shape. Since it connects to a device via Bluetooth, you can use it with a desktop, laptop, or tablet. The mouse depends on a pair of AA batteries, but the power switch on the bottom can help stretch their usable life, which Microsoft claims is about nine months. Thanks to the mouse's symmetrical design, it's usable whether you're right- or left-handed.

The touch strip in the middle provides tactile feedback, so you know exactly where your fingertip is resting without having to look down. The strip responds to horizontal and vertical fingertip swipes to scroll either horizontally or vertically. If you swipe quickly, you send the page flying in that direction until you tap again to stop. This gesture is great for reading through long documents or webpages.

The strip can be somewhat finicky in responding to pressure, which can result



in a misclick on occasion, but the Sculpt Touch Mouse is generally a stable and reliable input device. We like it almost as much as we do Microsoft's Touch Mouse. ★★★★★; \$50
go.pcworld.com/mssculpttouch

Microsoft Wedge Touch Mouse

Pros: Extremely portable and fits anywhere; Bluetooth connection; smooth touch sensor

Cons: Uncomfortably small; quirky response to right-clicking

When one editor with average-size hands first grasped Microsoft's \$70 Wedge Touch Mouse, his fingers overshoot its buttons by a good inch and a half. The pager-size device—it measures just over 2 inches square—has only enough room for your thumb and one finger to grab either side, and for your index finger to rest on top. Switching from a conventional mouse to this little devil doesn't feel natural at first.

Touch capabilities are limited to four-way scrolling: Slide your finger left or right to scroll horizontally, or slide toward yourself or away to scroll vertically. You won't find support for pinch-to-zoom, browser history, or media-player control features. Once we had figured out the right way to hold the Wedge Touch Mouse, the gesture controls worked without a hitch. Annoyingly, however, the right mouse button would not register a click as long as another finger was resting on the left mouse button. Needing to lift the one to use the other left us feeling like we were performing finger aerobics.

The mouse can connect to any Bluetooth device, including Android tablets and iPad models as well as Windows RT, 7, and 8 tablets and PCs running Windows 7 or Windows 8. The mouse operates on a single AA battery, but it doesn't have an on/off switch. When the device the Wedge Touch is paired with shuts

Logitech
Touchpad T650



down or enters hibernation, the mouse automatically goes into "backpack mode" and essentially turns itself off.

Despite the Wedge Touch's small size and cool technology, we can't recommend this product at its current price.

★★★☆☆; \$70

go.pcworld.com/mswedgetouch

Touchpad

TOUCHPADS ARE A common feature on laptop PCs, but no manufacturer has ever come up with a good design for integrating a touchpad into a desktop keyboard. If you don't have a touchscreen display, a well-designed touchpad can provide support for the multitouch gestures that make Windows 8 so powerful.

Logitech Touchpad T650

Pros: Comfortable surface; plenty of space to move around, tons of gestures

Cons: Inconvenient right-click; lacks gesture customization; requires two USB ports to charge and use

If you would like to ditch your mouse entirely, Logitech offers a capable alternative in the wireless Touchpad T650. The 5.25-by-5.1-inch input device recognizes 12 distinct gestures and up to four touch points, including left, right, and middle mouse-button presses on its silky-smooth surface.

As with most of the other touch peripherals we reviewed for this roundup, mastering the Touchpad T650 takes practice, but if you've memorized the Windows 8 gestures that a touchscreen display recognizes, you can use them all with this touchpad. Slide three fingers up the pad to bring up the Windows 8 Start screen, for instance, or slide three fingers down the pad to show the desktop. You can spread two fingers apart to zoom in, or pinch two fingers together to zoom out. Performing a right mouse-button click is awkward, though, because you must tap in a relatively small area of the bottom-right corner.

The T650 uses Logitech's proprietary Unifying transceiver, which you must plug in to the host's USB port (the entire transceiver is about as tall as a nickel, and most of that disappears into the USB socket when it's plugged in). It operates on a rechargeable battery. Logitech provides a USB charging cable in the box, but offers no AC power adapter, so if you're using and charging the touchpad at the same time, it will consume two of your computer's USB ports.

As we've noted with Logitech's other input devices, the company's SetPoint software provides little flexibility in customizing gestures.

Ultimately, while the T650's \$80 price tag might seem high, this product is a >>

much less-expensive alternative to a touchscreen display. ★★★★★; \$80
go.pcworld.com/logitech650

Stylus

A stylus offers the most practical way of upgrading your laptop PC to take advantage of Windows 8's touch-oriented feature set. Some people find that these pen- and brushlike devices also make for superior drawing and painting tools.

Targus Touch Pen

Pros: Turns a non-touchscreen into a touchscreen; handy for art applications; comfortable to use

Cons: Brush tip picks up lint; awkward installation

Months after the operating system's rollout, Windows 8 laptops with touchscreens remain few and far between. And if you have an old notebook that you've upgraded to the new OS, it's even less likely to have a touchscreen. Just attach the \$100 Targus Touch Pen to your machine, however, and bam— instant touchscreen.

It works only with displays up to 17 inches, though, so forget about using it with a large all-in-one PC. And some multitouch gestures—such as pinch-to-zoom and two-finger swipes—are simply beyond its capabilities. Installation is a hassle, too: You must stick a magnet on the laptop's bezel, plug the receiver into an available USB port, and then attach the receiver to the side of the laptop's display. You also need to perform a one-time calibration before you can put it to use, but the system doesn't require you to install drivers or special software to work.

The receiver responds only to input from the stylus, which has paintbrush-style bristles at its tip that can get clogged with dust if your screen isn't spotless. It won't recognize your fingertip or anything else, but the system works with the pen quite well. Picking up the pen is only marginally slower than taking your hand off the keyboard to use a mouse. The pen is comfortable to hold, and you can use all of the gesture controls in Windows 8 just as if you had a touchscreen. ★★★★★; \$100
go.pcworld.com/targustouchpen

Touchscreen Displays

Much has been written about Windows 8 and its touch capabilities. While the tiled Start screen has as many detractors as boosters, using a touchscreen display to scroll, pan, zoom, and swipe your way around the environment enhances your interaction with Windows 8.

You don't necessarily need a touchscreen for Windows 8, but swiping a finger to invoke the charm bar is certainly more fun than holding the <Windows> key and pressing C. I'll admit that initially I had to force myself to use the gestures, but after a short time with Windows 8 I found myself reaching out to touch even my MacBook Pro's screen.

Since the debut of Microsoft's latest OS, monitor makers have been working to bring touchscreen displays to market. We put three 23-inch models through their paces to find which one represents the best value, quality, and feature set, and deserves a spot in your workstation.

—James Galbraith

Acer T232HL

Pros: Ten-point touch; wide viewing angle; accurate colors; smooth gradients

Cons: Stand is difficult to set up and offers no height adjustment

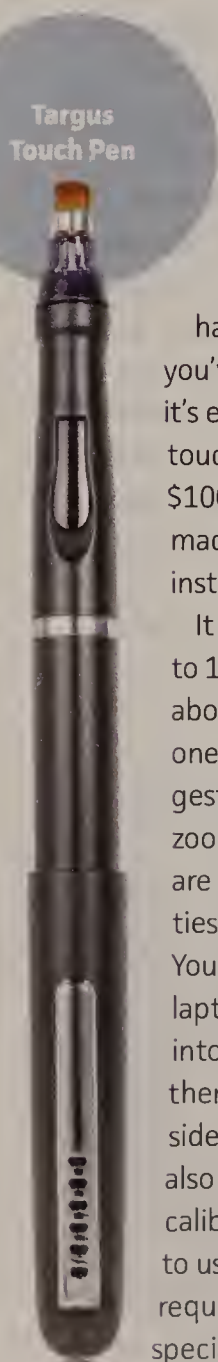
Acer's T232HL is a 23-inch, ten-point touchscreen LCD monitor with a 1920 by 1080 resolution. It uses environmentally friendly LED backlighting and a high-quality IPS panel for wide viewing angles.

The T232HL offers VGA, HDMI, and DVI inputs. Acer thoughtfully includes cables for each connection type in the box, but we still found the initial setup to be tricky. The hinged stand lies flat against the display for shipping; it took a lot of force (and courage) to open the stand, but eventually we were able to pull it into position. A note in the setup guide would go a long way to alleviate fears of snapping the base off your newly purchased monitor. The stand doesn't allow for height adjustment, pivot, or swivel, but it does tilt back to a 45-degree angle very easily, once you've set it up.

We connected the display via HDMI, and our test PC recognized it as a Windows touchscreen device, booting into its native resolution without issue. The T232HL delivered impressive performance as we ran the display through our battery of test images. On our solid-color screens, we found no stuck or dead pixels, and color and brightness were uniform across the screen. Its viewing angle was top notch, losing contrast only at extreme angles. Its glossy surface, which can be problematic in terms of glare, helps to enhance the appearance of photographs. Even gray tones appeared neutral at its default color settings.

Although no one would confuse the T232HL with a Retina display, its text was legible even at small point sizes. We also watched test clips of high-definition video, and the action played smoothly without any obvious artifacts. The model's built-in speakers are okay, if a little tinny; the speakers are in the back of the display, and they sound like it.

As for touchscreen performance, the T232HL was responsive and accurate. We didn't have any difficulties using the gestures, closing open windows, or selecting





**LG Flatron
23ET83V-W**

menu items. The stand's ability to lean back to a 45-degree angle made the touch features—especially the on-screen keyboard—easier to use for extended periods of time.

Despite our trouble during the initial setup, the Acer T232HL is a nice display that uses high-quality components. It performed admirably in our text, motion, color, and uniformity tests, and it would definitely be worth considering even without its ten-point touch capabilities.

★★★★★; \$549

go.pcworld.com/acert232hl

LG Flatron 23ET83V-W

Pros: Ten-point touch; IPS panel; LED backlight

Cons: Limited ergonomic flexibility; black levels require adjustment

The LG Flatron 23ET83V-W has a high-quality IPS panel with 1920 by 1080 resolution and an LED backlight. Sporting a white plastic case with a thin black bezel, this glossy-screened monitor connects to your PC via HDMI or VGA.

A red light illuminates a thin, translu-

cent, crescent-shaped plastic tab on the bottom edge of the screen that reflects off the desktop. The tab is not a button, but it sits below the buttonless touch power control. Although the absence of physical buttons may make for a cleaner, simpler-looking design, we prefer the tactile response of a button. Maybe we'd get used to the menus over time, but we found ourselves frequently hitting the wrong buttons and having to exit and reenter the menus.

Aside from a few degrees of tilt, the display's stand offers little ergonomic flexibility. You can't adjust the height, pivot it into portrait mode, or swivel it left or right. Other touchscreen monitors we've tested can lean back farther, which makes it easier for you to use touch gestures without shoulder fatigue setting in immediately.

A quick note about the setup: In our tests, when attached to an AMD graphics card, the display would boot up underscanned, with about an inch of black space around the screen. LG's on-screen menus have an Overscan

setting, but turning that from its default off position to on did not fully correct the problem. We had to turn off overscanning on the display and then go to the AMD Catalyst Control panel's advanced settings and move the overscanning slider to zero. In addition to the unwanted space, the screen looked blurry in this underscanned mode, and that affected calibration. When we attached the monitor to a system with an Nvidia-based graphics card, the proper resolution came up automatically and the image filled the screen as expected.

Once we had the screen properly set up, the 23ET83V-W performed well in most image tests. We found no stuck or dead pixels, and colors were uniform. Text was legible even at small point sizes, and photos looked good, although making out details in shadowy areas of each image was hard. In some of the Display-Mate gray-level test patterns, we were unable to see differences in the first few gray-level patches. Switching the Black Level control setting from Low (the default) to High resolved the issue.

As for the touchscreen capabilities, the 23ET83V-W performed admirably in that regard. The monitor was responsive and accurate, and we had no problems using Windows 8 touch gestures or choosing menu items and closing windows on the Windows 8 desktop.

The LG Flatron 23ET83V-W is a capable touchscreen display. Its viewing angle isn't as wide as that of most IPS screens we've tested, but is still very good. Its controls were a bit of a hassle to use, and we needed to make adjustments to the black-level settings to help the display look its best. While those are admittedly minor grievances, the monitor's lack of ergonomic agility could reduce the amount of time you end up using its touch capabilities. ★★★★★; \$550
go.pcworld.com/lg23et83vw

ViewSonic TD2340

Pros: Ten-point touch; wide viewing angles; versatile stand; DisplayPort
Cons: Not very attractive; bulky and heavy

ViewSonic's TD2340 display is built like a tank, weighing a hefty 20.4 pounds. It features a 23-inch, LED-backlit IPS panel that delivers a resolution of 1920 by 1080 pixels, and it supports ten touch points.

The TD2340 sports a heavy-duty, dual-hinged base that offers a few inches of height adjustment, the ability to pivot into portrait mode, and even the option to tilt the display down so that it sits completely flat like a tabletop. At a height of 6 inches above the desk, however, the flat orientation seems like an awkward way to work. The best position we found for typing directly on screen using a touch keyboard was tilting the panel back to a 45-degree angle and lifting the bottom-front edge a couple of inches off the desk. This position allowed us to type on the screen with-

out reaching as far, while still being able to keep our physical keyboard and mouse situated in front of us.

You can connect the TD2340 to your computer via HDMI, DisplayPort, or VGA. To use the touch capabilities, you need a USB connection as well. The on-screen controls are simple and easy to use, which we find refreshing. Button 1 brings up the menus, while button 2 selects with up and down arrows for adjusting color, brightness, contrast, volume from the SRS speakers, the on-screen menu position, and much more.

The TD2340 offers a wide viewing angle, which is helpful if you collaborate with other people around your screen or if you take advantage of the aforementioned flexible stand to position the screen at nonstandard angles. In tests, text was legible even at small point sizes, and colors were uniform across the screen. We found no stuck or dead pixels when

testing the display. The glossy screen helps to give photographs more depth, but glare can be an issue. You'll need to consider where, in relation to windows or other fixed light sources, to position a glossy-screen display like the TD2340.

The ViewSonic model's ten-point touch capabilities were impressive. Input was responsive and accurate, and we didn't have any problems using Windows 8 gestures or maneuvering around the Windows 8 desktop.

Of the Windows 8 touchscreen monitors we've evaluated, the ViewSonic TD2340 is the most capable. Its wide viewing angle, its agile yet bulky stand, and numerous little touches such as SRS speakers, multiple inputs, and easy-to-use menus combine to make the TD2340 a great choice for Windows 8 users. It's more expensive than some other touchscreen displays, but it earns its price tag. ★★★★★; \$635
go.pcworld.com/viewsonictd2340 ●



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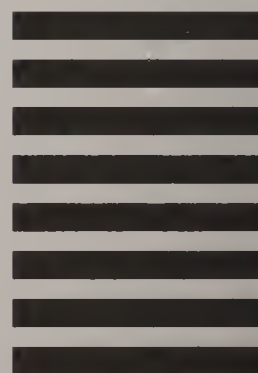
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BY BRAD CHACOS | ILLUSTRATIONS BY MIRACLE STUDIO



This ain't your momma's Internet.

Update your browser. Ditch Java. Don't click weird links from even weirder people. Ho-hum. The basic tenets of security are burned into the brains of most Web surfers by now, and the old malware tricks just don't work as well anymore.

Surprise! Bad guys are getting creative. (Never underestimate the powerful combination of greed, boredom, and cleverness.) Rather than targeting Internet Explorer, now these people are gunning for your virtual machine, your video games, and your Web-connected thermostat.

"The more digital our lives become, the greater the number of potential nontraditional entry points for cybercriminals attempting to steal data and wreak havoc," says McAfee Labs security strategist Toralv Dirro, who referred us to some of the wild exploits highlighted here. Grab your tinfoil hat, and let's take a walk down wacky-hack lane.

The Chamber of Chaos

First things first: Many of the more exotic exploits in this collection have been identified by security researchers, but haven't been found in the wild. Before you write off these dangers as tomfoolery confined to labs alone, however, consider the terrifying case of the U.S. Chamber of Commerce.

In 2010, the chamber was the subject of a deep and complicated intrusion (go.pcworld.com/exp1). The penetration was so thorough that once authorities discovered the problem, the chamber found it easier to destroy some PCs completely rather than scrub them clean.

That's scary enough, but what happened after the problem was "eliminated" is even more frightening: One of the chamber's thermostats was found to be communicating with Chinese servers, while one executive's printer began spitting out pages composed entirely in Chinese. And that brings us to the next wild exploit...

iPeep at Your Printer

The convenience of network- and Web-connected printers is undeniable—printing from anywhere is awesome—but many of those Web-connected printers sit outside of firewalls, just waiting for an enterprising hacker. A pair of reports in January highlighted the potential peril lurking inside printers (go.pcworld.com/exp2).

First, ViaForensics researcher Sebastian Guerrero identified vulnerabilities in HP's JetDirect technology that hackers could exploit to crash the hardware or to gain access to previously printed files. App developer Andrew Howard followed up with a blog post detailing how a well-crafted Google search could identify tens of thousands of Web-accessible HP printers.

Printer exploits aren't new, but as traditional exploits become less effective, wide-open office devices become big, fat targets.

Too Smart for Their Own Good

Bad things are starting to pop up on Internet-enabled "smart TVs," and no, I'm not talking about episodes of *Here Comes Honey Boo Boo*.

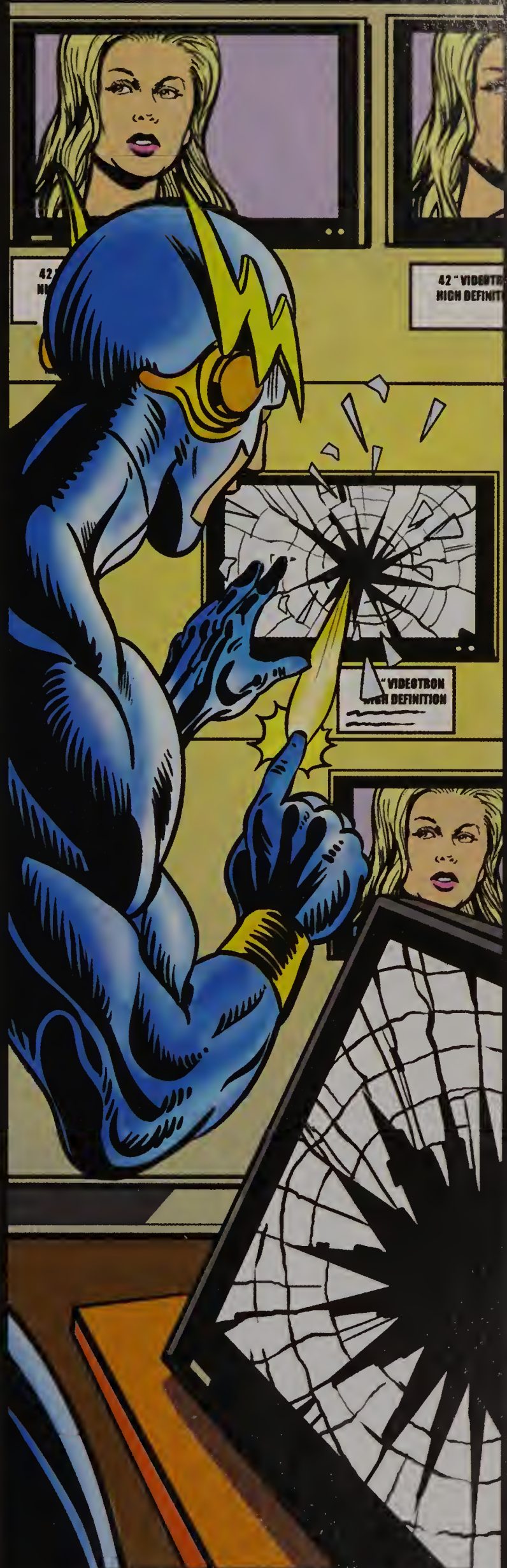
"Modern TVs are also attractive targets, especially for advanced attackers," says McAfee's Dirro. "Of all the systems that are being checked if a compromise is suspected, TVs are probably the last place to look. In December, ReVuln, a security company in Malta that sells 'zero-day' exploits, announced that they have a remote-code-execution vulnerability for [Samsung Smart TVs]." (Visit go.pcworld.com/exp3 for details.)

Big deal, you say? Consider that some connected TVs sport integrated webcams and mics, and that all of them can store login information for your Web-connected accounts. The aforementioned zero-day exploit gives hackers root-level access to your TV and helps them snoop through a USB drive connected to your boob tube.

Why DRM Sucks, Part 3279

PC gamers across the world often snarl whenever the words *digital rights management* are uttered. In particular, gamers frequently single out Ubisoft's DRM antipiracy implementations for their special wrath. Their anger reached new heights last July, when someone discovered that Ubisoft's Uplay gaming service silently installed a sloppily coded browser plug-in that hackers could exploit to gain control of a gamer's computer (go.pcworld.com/exp5). Gee, thanks, Assassin's Creed 2.

Ubisoft patched the hole mere hours after its discovery—with nary an apology, natch—and, fortunately, there's no evidence that anyone ever used it maliciously. >>





Steam-Soured

The Ubisoft flaw isn't the only unorthodox video-game exploit around. Late last year, ReVuln—the same firm that discovered the smart-TV exploit—found that the **steam://** protocol for Valve's Steam application can be exploited to launch malicious code (go.pcworld.com/exp6).

The problem actually lies in browsers that automatically execute **steam://** commands without a confirmation warning (Safari) or with minimal info (Firefox). Once malicious code gains permission to run, it can use Steam's legit capabilities or known vulnerabilities to fill your hard drive with all sorts of nasty stuff. Moral of the story? Don't set your browser to automatically allow Steam protocol executions.

Yes, VMs Can Play Crisis

Enhanced security is one of the big benefits of running a virtual machine on your PC: If the crud hits the rotating blades, you can simply wipe the disc image and start anew. But a piece of malware called Crisis turns that notion on its head by directly targeting the VM.

Symantec reports that once Crisis settles in on your PC—you first must download a malicious JAR file—it looks for VMware virtual-machine images stored on the hard drive. If it finds one, it embeds itself in the virtual machine using the VMware Player tool. This isn't actually a VMware vulnerability, but rather a side effect of the nature of VMs: They're just lines of code stored on your physical machine, and are only as safe as your PC is. For its part, VMware says that encrypting VM images can thwart Crisis (go.pcworld.com/exp9).

Bad-News Borg

If Inspector Gadget ever tries to give you a hug, run away screaming. The cybernetics that seem so cool in games like *Deus Ex* are vulnerable to the same exploits as any other electronic device, as evidenced by the ominous tale of Mark Gasson, the first human being to contract a computer virus (go.pcworld.com/exp7).

Gasson, a cybernetics expert at the University of Reading, England, deliberately infected an RFID chip (used to give him access to the university lab) with a custom-made virus and embedded it in his hand. When he swiped the chip in front of the lab's computers, the virus jumped to the lab's database and then infected the RFID swipe cards of any of his colleagues who entered the facility.

The scientist's proof-of-principle attack highlighted the need for caution in a society that already includes people walking around with mechanical hearts and deep-brain stimulators. "A denial-of-service attack on a pacemaker, if such a thing were possible, would of course be very detrimental," Gasson told TechNewsDaily.

Android Apps' Bait and Switch

Kaspersky researchers have discovered two apps in the Google Play store, DroidCleaner and Superclean, that purport to restart all running services on your phone, but do their dirty work when you connect your Android handset to your Windows PC as a disk drive—say, to transfer music or pictures (go.pcworld.com/exp10).

If your PC has AutoRun enabled, code that the apps hide in the root of your phone's SD Card installs the malware. The malware monitors your PC's mic, and if it notices sound, records the audio, which it then encrypts and sends to the malware's master. Devastating? Unlikely—by itself. But the authors stuffed these apps with lots of nasty extras.

Simon Says 'Pwned'?

In 2007, ZDNet's George Ou discovered that it's possible to create an audio file that barks out Windows Speech Recognition commands, which your computer duly follows (go.pcworld.com/exp4).

So why wasn't the Net deluged with websites whispering dulcet word hacks? Because the exploit is impractical. You'd need to have Windows Speech Recognition activated and paired with a working speaker and microphone, plus you'd need to sit idly by while your PC spit out the navigational commands. And even so, Windows' UAC protection would block the attack from running privileged functions.

As far as I can tell, the vulnerability hasn't been plugged, but I agree with Microsoft's Security Response Team, which basically said not to sweat it (go.pcworld.com/exp8).

I'm in Ur Base, Spying on Ur D00dz

That fancy videoconferencing setup your company recently purchased could be the proverbial fly on the wall for bad guys. "Some videoconferencing systems are accessible via the Internet and present the perfect target for listening in on a company's secret videoconference calls," says McAfee's Dirro.

In 2010, security researchers were able to take advantage of multiple vulnerabilities in Cisco's Unified Videoconferencing products (go.pcworld.com/exp11) to completely compromise the devices, granting full access to the hardware as well as to any networks the hardware was connected to. (Cisco quickly patched the flaws.)

In January 2012, security researchers found that some 150,000 videoconferencing systems are set to answer calls automatically, basically giving bad guys unfettered ears and eyes—amplified by strong mics and zoom lenses—in your building. Check your settings! ●



Here's How



Lock Down Your Laptop When You're on the Road

BY ALEX CASTLE

MOBILE COMPUTING MAY be convenient, but it's also risky. When you drag your laptop to the coffee shop or take it along on your travels, you risk making all your private data and an expensive device a big, fat target for thieves. The baddies just need to wait for you to turn your back, then grab it and run. Fortu-

We show you how to protect your laptop and keep all your private data locked up tight when you're out and about.

nately, you can minimize such perils by taking a few precautions and following some commonsense practices.

Lock the Front Door

When you go on a vacation, you don't leave your front door unlocked. You shouldn't

leave your laptop completely defenseless, either. Lock your laptop's proverbial front door by making sure your Windows user account is set up to require a password on login. This will not protect against even a semi-competent hacker, but it could be enough to

dissuade unsophisticated criminals from snooping through your private files after stealing your laptop.

Windows makes it very easy to change your password or set one up. In Windows 7, just press <Ctrl>-<Alt>-<Delete> and select *Change Password*. After that's set, head to *Power Options* in the Control Panel, click *Require a password on wakeup* in the left-hand pane, and click the radio button next to *Require a password*.

In Windows 8, just search for **Users** to open up the Users menu in your PC settings. Here you'll find options

to both change your password and require users to log in when they wake the PC.

Encrypt Your Data

A user account password won't protect your data from a determined snoop—they're easily cracked, or the thief can simply plug your hard drive into a different computer to access your files directly. If you travel and have any files that you don't want anyone to see, you should use full-disk encryption.

This step keeps the data on your hard drive safe from anyone who doesn't know your password. If you have Windows Vista, Windows 7 Ultimate or Enterprise, or Windows 8 Pro or Enterprise, you already have full-disk encryption in Microsoft's BitLocker software. It's easy to enable BitLocker, and when you do, your drive will be automatically encrypted using your Windows user account password. If you don't have a professional version of Windows, or your computer doesn't have a TPM (Trusted Platform Module) chip, you can still use full-disk encryption with the free software TrueCrypt.

Because the strength of encryption is almost entirely dependent on the strength of your password, now would be a good time to talk about good password practices. You have probably heard it before, but a password can be easily cracked if it's too short or simple, or if you use the same one across multiple services. For the rest of your security measures to be effective,

TrueCrypt Volume Creation Wizard

Create an encrypted file container

Creates a virtual encrypted disk within a file. Recommended for inexperienced users.

[More information](#)

Encrypt a non-system partition/drive

Encrypts a non-system partition on any internal or external drive (e.g. a flash drive). Optionally, creates a hidden volume.

Encrypt the system partition or entire system drive

Encrypts the partition/drive where Windows is installed. Anyone who wants to gain access and use the system, read and write files, etc., will need to enter the correct password each time before Windows boots. Optionally, creates a hidden system.

TrueCrypt encryption works great and it's free, to boot.

make sure you follow these three simple rules:

Use a password that has at least 12 characters and features a mix of both lower- and uppercase letters, as well as symbols and numbers.

Don't reuse passwords. This is true especially for sensitive accounts such as your email, bank, and Windows login.

Be sure to change your password frequently—every six months for important passwords, at the minimum.

A free password manager

such as KeePass can make it easier to follow these rules.

Use a VPN

Wi-Fi networks that are unsecured present a major threat to your system's security on the road. You don't know who else is sharing the network and potentially intercepting packets wirelessly sent by your computer. Basic HTTPS Web security does a good job of protecting data sent over the Internet, but you are essentially at the mercy of

the receiving site's security protocols. If you're transferring sensitive data, the sensible solution is to always use a virtual private network.

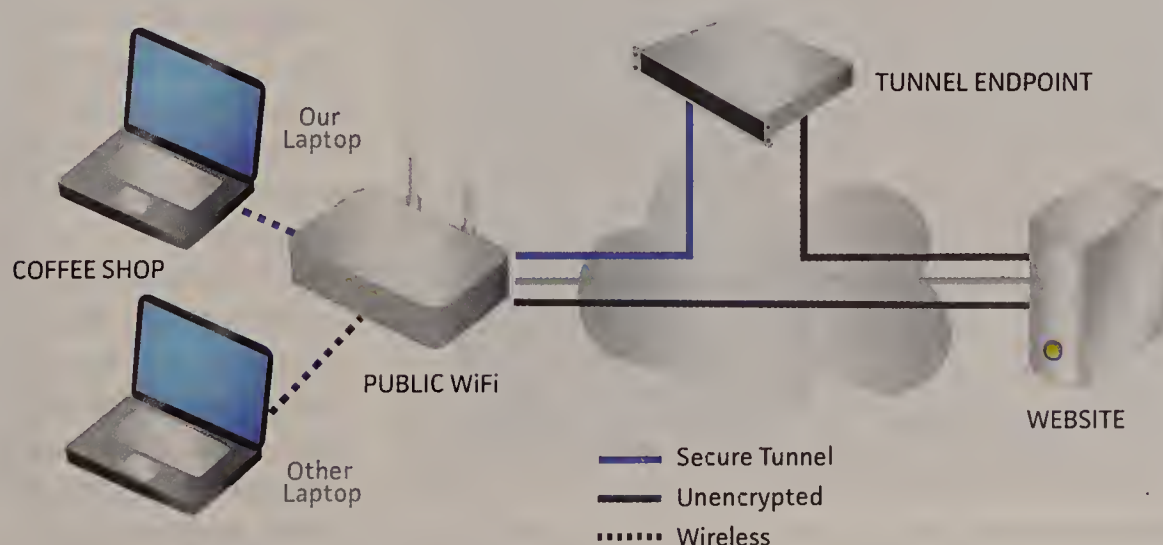
With a VPN, traffic originating from your laptop is encrypted, then sent to a third party server, from where it can safely be forwarded to the Web, safe from any prying eyes. You have lots of options for connecting to a VPN—your company may provide one, or you can set up your own VPN server at home. But for most people, the easiest option is to use a Web-based VPN, many of which offer a limited free service as well as low-price monthly rates.

Install Prey

So far we've talked about how to keep your data safe if your laptop is stolen, but data's not the only thing at stake here—laptops themselves are quite expensive. That's why you should have a plan for retrieving your laptop should it >>

VPN Security

This diagram shows the difference between an unencrypted and a VPN-secured connection.



Here's How

be lost or stolen. We recommend using a program called Prey (preyproject.com).

A (mostly) open-source application, Prey helps you locate your laptop. When everything's normal, it runs silently in the background and barely consumes any system resources. If your laptop gets lost or stolen, you can remotely activate Prey, and it will begin sending status updates on your laptop to the Prey website. The program tracks the laptop's location based on nearby wireless networks, and also captures screenshots of what the thief is using it for. The software can even use the laptop's

webcam to send you photos of whoever's using your laptop, or remotely lock down the laptop to prevent the thief from using it.

The free version includes all that functionality, and allows you to save up to ten reports at a time for three devices. A subscription of \$5 per month lets you keep more reports and increase their frequency.

LoJack for Laptops is a highly regarded premium alternative to Prey. One-year subscriptions start at \$40.

Physical locks are a strong deterrent against snatchings.



Consider a Remote Data Deletion Service

Now, we don't necessarily recommend this step to all users. The full-drive encryption is almost foolproof as long as your password is strong. Still, if you're carrying really important company data, ask your IT department about setting up a remote deletion service, which can allow you to delete specific files or even whole drives over the Internet.

Again, for personal use, we recommend full disk encryption, which is very reliable and doesn't involve a monthly fee. If you want the option available, however, LoJack for Laptops includes a remote data deletion option that overwrites data sectors seven times to ensure that the information is truly gone.

Follow Good Physical Security Practices

The best way to protect your data, of course, is to not let your laptop get stolen in the first place. Here are a few simple ways to help keep your laptop safe:

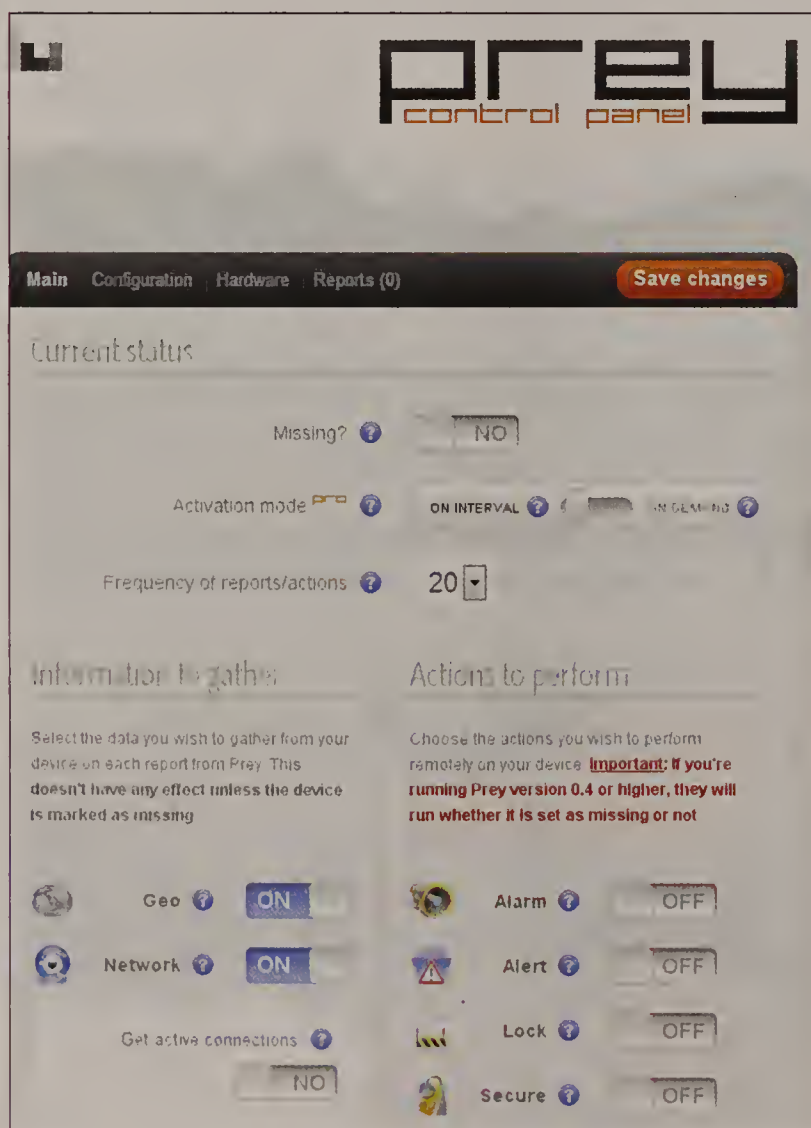
Don't leave your laptop unattended. This should be obvious, but most laptop thefts aren't burglaries or robberies—the thief simply makes off with a laptop when the owner isn't looking. So if

you're working in a public place and need to use the restroom, pack that laptop up and take it with you. Even if you just need to turn around to talk to someone for a few minutes, keep one hand on your computer.

Don't leave your bag unattended, either. Many thefts occur on buses and trains, or in airports. Keep your bag in sight at all times, if possible. If you have to put your bag on the floor, keep it between your legs and hook one foot through the strap.

Take advantage of security devices. Many laptops come with a security port, where you can attach a lock to connect your laptop to another object. Kensington makes the most popular line of locks, and many laptops include a Kensington security port. You still shouldn't leave your laptop unattended even with a cable and lock, as thieves can cut or break these.

Secure laptop cases are also available at fairly cheap prices. You can tether these laptop cases to a nearby fixture. If you're going to pass through an area that you consider unsafe, a simple plastic zip-tie also can also provide some measure of (very) temporary security for your bag.



Prey's website shows status updates about your stolen laptop.

Play PC Games on Your Linux Machine

Skip Windows and give Linux a try. We show you how to play modern PC games using the free and open-source platform.

LINUX IS GETTING more user-friendly every year, and you might be wondering if Windows is still required to reliably use your PC as a modern gaming platform. The truth is that probably you don't. It still depends a bit on your hardware, but for the most part Linux is a robust gaming platform.

To prove it, we're going to show you how to play modern PC games on a Linux PC. This guide will target the newest version of Ubuntu (12.10), but you can apply most of it to any other Debian-based Linux distribution. We'll assume that you've gotten as far as installing Linux, but that's it.

Linux Cheat Sheet

Here's a rundown of important terms for a novice user:

WINE: A compatibility layer used for running Windows programs on Linux.

PPA: A Web address with one or more prebuilt applications for a specific version of Linux. Using PPAs to install third-party software helps sort out compatibility issues.

sudo: A command used in front of terminal commands to give you administrator rights to change an important part of your system.

Let's Get Started

First, you need to install the correct graphics drivers. This depends on your video card.

The simplest rule of thumb is to get a mid-tier GeForce card that's at least a year old—as of this writing, that would be a GeForce GTX 560 Ti. If you've already got a different card, don't worry just yet—read on.

GeForce Drivers: This is the simplest and most compatible option. Open a terminal and enter the following commands, remembering to press *Enter* after each one:

```
sudo add-apt-repository
ppa:ubuntu-x-swapt/x-
updates
sudo apt-get update
sudo apt-get install
nvidia-current
Reboot, and you're done.
```

You'll automatically get updates for this driver.

Intel HD Graphics or AMD Radeons older than the HD 6xxx series:

If you don't have an Nvidia GPU, getting Linux drivers is a little more complicated; Nvidia develops its own driver for Linux rather than releasing open-source code. But Intel and AMD release drivers as open-source code, so we're going to get the fastest (but stable) version from a community maintainer.

A disclaimer: These are pretty good, but you are getting them from an unofficial source. They won't always get you performance comparable to what you'd see in Windows, and they may work in slightly fewer bleeding-edge games than the Nvidia drivers.

Open a terminal and enter :

```
sudo add-apt-repository
ppa:oibaf/graphics-drivers
sudo apt-get update
sudo apt-get dist-upgrade
```

Now reboot. These drivers will also automatically update thanks to Linux PPA.

AMD Radeon HD 6xxx or newer: The open-source development of AMD's Linux drivers tend to lag behind a bit, so the company provides a closed-source Linux driver for newer cards. Compared to Nvidia's official Linux drivers, performance might not be as good as on Windows, but try them out; depending on the games you play, you may find no difference at all.

Point your browser to AMD's website and select your video card and OS (Linux x86_64 in most cases) from the drop-down menu. >>



You can play Nimbus on a Linux machine running Wine.

Download the file and unzip it to the Desktop (just as you would in Windows), then open a terminal and enter:

```
cd Desktop
sudo sh amd-driver-
installer-catalyst-
12.10-x86.x86_64.run
```

AMD's installer will run to install and configure the AMD drivers, along with the Catalyst Control Center GPU management software. These may not automatically update as you didn't get them from a Ubuntu PPA. An update option should be in the

run the following commands:

```
sudo add-apt-repository
ppa:ubuntu-wine/ppa
sudo apt-get update
sudo apt-get install
wine1.5
sudo apt-get install
winetricks
```

The system may ask you if it can install other packages; go ahead and say yes. Once this is done, it's time to get in the habit of using Ubuntu key shortcuts—press the Windows key and then type **winetricks**; press Enter. The Winetricks interface will

- *optionally* dotnet3.5. Skip this step for now.

Click *OK*, and everything will install; Now on to the fun part: playing games.

Winetricks is a program installed alongside Wine that lets you quickly install Windows libraries. Once open, click *Select the default wineprefix*, press *OK* and then Install a Windows DLL or component; press *OK* again.

Where to Get Games

The Humble Store and the Ubuntu Software Center: The

Ubuntu Software Center.

Steam: If you have Wine, there's currently very little reason to use the Linux version of Steam. I'd recommend sticking to the Windows version as it works flawlessly, and using the Linux version of Steam only if you really need an extra five or so frames per second in a game.

Emulation: If you like console titles, you're in luck—at least one emulator for just about every major platform has a Linux port. Some older consoles, like PCSX for the PlayStation, are available from the Ubuntu Software Center; newer ones like Dolphin for Gamecube/Wii require that you add the developers' PPAs.

Older Native Linux Ports:

Over the past decade, there have been a number of semi-official Linux ports of PC classics. An example is Unreal Tournament 2004: Using the official Windows DVD, you can install it with a special Linux patch from the Linux Installers for Linux Gamers website (a good resource for finding such patches, but not the only one), and voilà!—a native version of an over-eight-year-old game that works more or less out of the box on a modern version of Ubuntu.

If you face any problems, go through our troubleshooting tips at go.pcworld.com/linuxgamestips.

If the wind is in your favor, you'll be gaming on Linux in no time, and you might even find that you don't miss Windows at all. Welcome to the world of free software.

—Alex Garnett



The Windows version of Torchlight 2 runs flawlessly in Wine.

Catalyst Control Center. So, reboot, and you're done.

Install Wine

Wine dramatically expands your horizons for gaming without Windows, so it's highly recommended that you install it in your system. Simply open a terminal and

open. Then select the following packages:

- everything beginning with "d3dx"
- quartz
- vcrun2005, vcrun2008, and vcrun2010
- wininet
- xact, xact_jun2010, and xinput

Humble Bundle packages multiple indie games into a pay-what-you-want "bundle" for use on Windows, Mac, or Linux. It's probably going to be your best source for games that run natively and are thus (almost) guaranteed to work. If you miss a bundle, you can get it for full price from the

How to Enable Family Safety in Windows 8

THE INTERNET IS kind of a cesspool. And as the parent of kids who are now old enough to operate a Web browser, I'm keen on checking their activities and filtering out the inappropriate content.

Thankfully, Windows 8 offers some solid tools for

a new account. If this PC is the only one that your child will be using, you can also sign in without a Microsoft account; you should then tap *Local account*.

4. Tick the box marked *Is this a child's account?*, and then click *Finish*.



Win 8 offers some great tools for enabling family safety features.

doing just that. For example, you can limit your child's Web browsing to age-appropriate sites and block or allow specific sites as needed. You can impose time limits, perhaps locking out the PC during hours when you're at work and not able to supervise. And you can control what games and apps they can play or use. To get started, you'll need to set up an account for your child. Here's how you can do that in Windows 8:

1. Open the charms bar, then click *Change PC settings*.
2. Click *Users*, and then *Add a user*.

3. Choose the appropriate option. If your child already has a Microsoft account, you can enter it and use that. Or you can sign him or her up for

Now you're all set to configure any blocks or limits.

Microsoft explains how to set up such restrictions in some detail, so I won't rehash that information. Once you've got the account set up, you'll be able to monitor your child's activities from either the PC where the account was created or your own.

If you're looking for a more robust solution, Mobicip has a Windows 8-compatible version of its desktop tool (go.pcworld.com/mobicip). It offers dynamic filtering, and it lets you manage more than just Windows computers. In other words, you can monitor your kid's phone or tablet (or both) as well. It costs \$10 per year per device.

—Rick Broida

ANSWER LINE

Q Can I replace a laptop screen without spending a fortune? —*Carlene Primus*

REPLACING A LAPTOP screen, including parts and labor, shouldn't cost you more than \$300.

The first question you should ask yourself: Do you want to pay someone to do the repair, or make it a do-it-yourself-project?

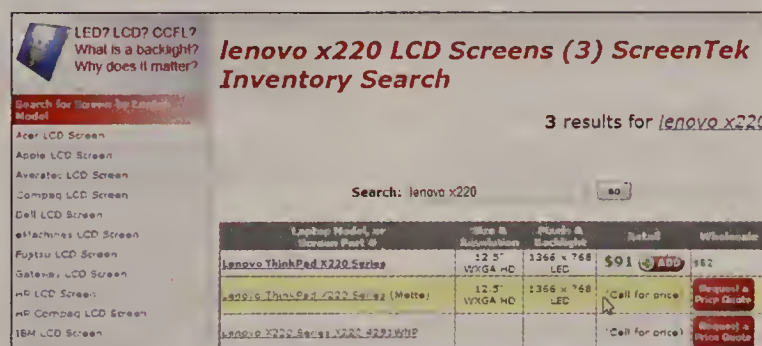


LINCOLN SPECTOR

Unless you have experience repairing laptops or want to acquire that experience, I strongly recommend hiring a professional. Yes, it will add about \$100 to the price, but if you make a serious mistake, the final repair could cost you a lot more.

Unless the damage is covered by a warranty (and it almost certainly isn't), I recommend against going to the manufacturer. You could easily end up waiting weeks while boxes are shipped back and forth, only to get low-quality work, have your hard drive reformatted for no reason, or be overcharged for the experience. Or, perhaps, all three.

I generally find I get better service from a small business run by people I can look in the face. So pick out a local computer repair shop. Ask friends, try Yelp, or search the Internet. That small business will almost certainly buy the replacement screen from the online retailer ScreenTek. You should check out this site yourself to see what's avail-



able for your model and at what price (usually about \$100). Enter your laptop's make and model number in the Product Search field, and you'll quickly find the answers. It's a good idea to have this information when you call the repair shop.

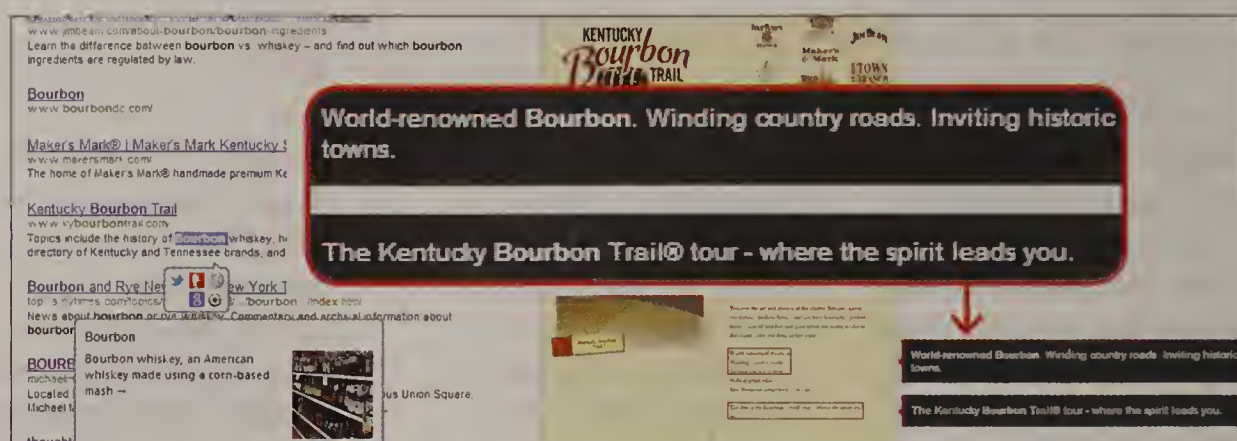
You'll really need ScreenTek if you decide to do the repair yourself. For more on that subject, visit go.pcworld.com/insaneupgrades.

ScreenTek is a good resource for laptop screens.

Supercharge Google Chrome With Extensions

IF YOU DON'T have the latest version of Chrome, take the preliminary steps to install it. Then open the Chrome Web Store, and you'll see an overwhelming array of Chrome apps. The three that we'll focus on here are designed to make Chrome leaner, meaner, and more efficient.

FastestChrome: As its name suggests, this app adds useful time-saving tools to your Chrome browser. It consists mainly of surface-level stuff, such as displaying a pop-up bubble with an explanation of a word whenever you highlight one, and providing the option to look up that word on any of four different search engines (Wikipedia, DuckDuckGo, Surf Canyon, and of course Google.) The extension also lets you automatically trans-



FastestChrome shares the definition of any word that you highlight in Chrome.

form written URL text into clickable links, and its Endless Pages feature automatically loads the next page of a website (think Google search results or a multiple-page article) so you don't have to waste precious time clicking Next and waiting for the page to load.

Google Quick Scroll: This app whisks you straight to the search terms you're look-

ing for on any given website. With Google Quick Scroll installed in Google Chrome, every time you click through a search link, a tiny box containing a preview of the text highlighted in your search result will pop up in the bottom-right corner of your browser. Click that box, and Chrome will take you there without further ado.

Chrome Toolbox: Install

the Chrome Toolbox to open multiple bookmarks in a single click, and cache unsubmitted form data so you can avoid retyping it each time you create a new profile. It will also help you to magnify images and video right from within your browser, and in general make Chrome twice as useful as it already is.

—Alex Wawro and Marco Chiappetta

EASY FIX: OPTIMIZE AND DEFRAGMENT YOUR PC

AFTER UPDATING YOUR system and removing any junk data and malware, run a disk defragmenter to minimize file fragmentation and improve the perceived performance of your hard drive.

To defrag a drive, right-click it in File Explorer and then choose *Properties* from the menu. Click the *Tools* tab in the window that pops up, and click the *Defragment now* (Windows 7) or *Optimize* (Windows 8) button to launch Windows' built-in defragmentation tool. Then, when the defragmentation tool has opened, highlight your hard drive and start the

You can optimize your drives to help your computer run more efficiently, or optimized. Only drives on or connected to your computer are shown.		
Status		
Drive	Media type	Last run
SSD Volume (C:)	Solid state drive	11/29/2012 3:02 AM
Secondary Volume...	Hard disk drive	12/14/2012 10:08 A...
RAID 1 Volume (E:)	Hard disk drive	12/19/2012 10:47 P...
System Reserved	Solid state drive	Never run

Defragging is a good idea after a thorough PC cleaning.

defragmentation process.

Please note that you should never run a disk defragmentation tool on a solid-state drive. SSDs are not affected by file fragmentation in the same way as hard drives are and don't need to be defragged. (Defragging SSDs actually shortens their lifespan.)

Most modern SSDs have idle garbage collection or a feature called TRIM that will

optimize free space when a system is idle. After purging a bunch of data from an SSD, you should restart your system and just let it sit idle for a while to let the SSD do its thing.

—Marco Chiappetta



Diagnose USB Charge Problems

IF YOU'RE TRYING to use a USB port to charge a device, but it isn't working, you can find tools in Windows that may improve the situation.

Go to *Control Panel* ► *Device Manager*, and select *Devices by Connection* from the View menu. Click the name of your PC and press the asterisk (*) key. This will open a list of the devices connected to your system. Scroll down till you find 'Generic USB Hub'. Right-click that item and select *Properties*. Then click the *Power* tab. You'll see a list of USB devices, and the amount of power that each one is drawing. This information can help you determine whether the device will charge quickly or slowly given the amount of power it's drawing. When I checked this list on my computer, I found that my cell phone was drawing just 96mA. So even though the phone showed that it was charging, it was receiving only a trickle of power, and would probably never have charged fully.

—Richard Baguley

HASSLE-FREE PC

Browse the Kindle Lending Library on a PC



RICK BROIDA

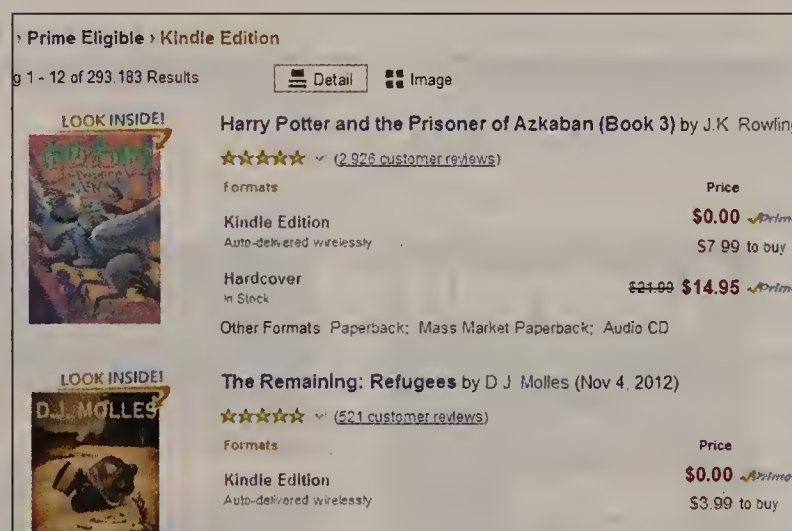
Find Kindle ebooks using the Web browser. Also: Access your old floppy disks.

AS AN AVID reader, I thought subscribing to Amazon Prime seemed like a good idea. After all, the \$79 per year membership lets you check out one ebook per month from the Kindle Lending Library, which is rapidly approaching 300,000 titles.

But how do you find those titles? If you've ever gone searching for "Kindle Lending Library," you know that there's no such thing—not in your Web browser, anyway. Although Amazon

lets you browse the collection on the Kindle, there's no direct link to it anywhere on Amazon's site. Fortunately, reader Danner discovered that you can indeed browse the Lending Library in your browser; it just takes a little doing. Here's the process:

1. Point your browser to Amazon.com.
2. At the left edge of the search bar, click the little arrow next to All, then click Books.
3. At the other edge of the search bar, click Go.
4. Scroll down till you see Amazon Prime in the left-hand toolbar. Then click the Prime Eligible box.



Finally a way to browse the Kindle Lending Library in your browser.

How to Access Your Old 3.5-Inch Floppy Disks

Needless to say modern PCs don't have floppy drives. (Same goes for not-so-modern ones.) So how can you hope to access your photos, WordPerfect documents, and any other old data that might be lingering on those disks?

You could try to borrow an old PC that has a disk drive, but then you're faced with the problem of transferring the data to your own PC. Depending on how old that borrowed machine is, it might not have a USB port.

No, a better bet is simply to spend a few bucks. I did a little shopping on Ebay and found plenty of 3.5-inch external floppy disk drives, most of them selling in the \$10–\$15 range. If you'd rather not go the auction route, Newegg also sells an external floppy drive for \$15 shipped. (Just be sure to check the user reviews for some tips on using it.) I think that's a fairly small price to pay for the simplicity of accessing your old disks on your modern PC. Just plug the drive into a USB port and you should be good to go. ●

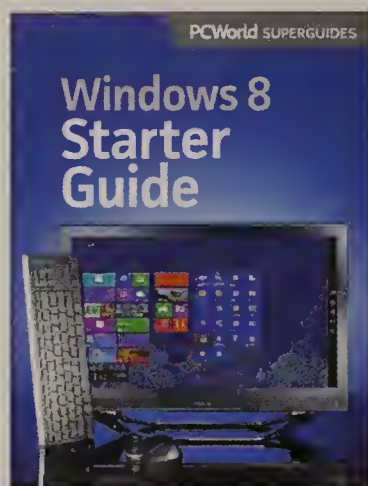
5. On the following page, in the Format area, click the header marked Kindle Edition.

Presto! Now you're looking at every single book Amazon lets you check out for free as part of your Prime membership. And from here you've got six sorting options via the drop-down "Sort by" box on the right.

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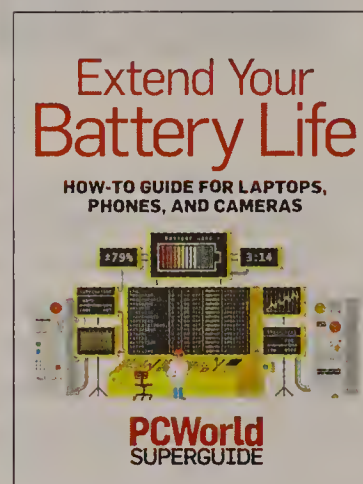
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GET STARTED with Windows 8. Follow step-by-step instructions to install the new operating system.



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EXTEND BATTERY LIFE in your laptop, phone, and camera with these useful hints and tricks.



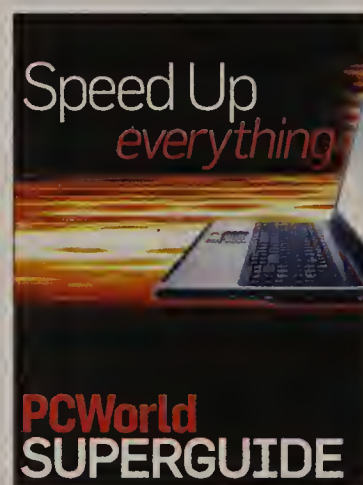
ICE CREAM SANDWICH is the most delicious Android OS yet. Get the scoop on Google's latest mobile OS.



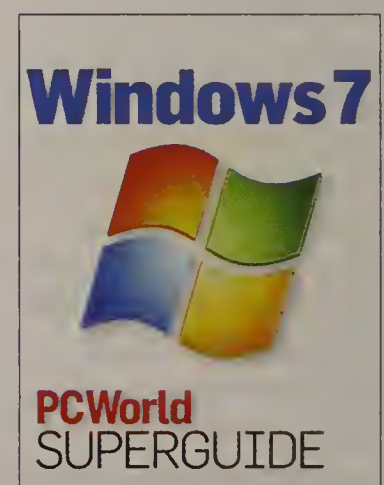
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Five Things

YOU MUST KNOW ABOUT...

3D Printing

Poised to take the tech world by storm, 3D printing is not only getting increasingly affordable, but it has more to offer than just funny-looking MakerBots; it may change the way we live, work, and play—in short, get ready for the DIY future.



1

It's Additive

A 3D printer extrudes tiny layers of a single material—plastic, typically—again and again, to build a 3D object. The process is known as additive manufacturing, and it can be much more efficient, and cheaper and faster, than traditional subtractive manufacturing, where engineers cut parts from larger pieces of material. Consumer-grade 3D printer costs are dropping so fast that, by 2016, analysts say, enterprise-class 3D printers may cost less than a new computer.

2

Digitize Objects

If you have a cheap 3D printer, you'll probably need a tool to scan objects you want to reproduce. Enter the MakerBot Digitizer, a 3D desktop scanner announced in March. The Digitizer will let you scan small household objects, creating 3D design files that can be shared, backed up, and reproduced. Pairing a Digitizer with a 3D printer could let you “back up” physical items and print replacement parts as necessary, or make modifications to better suit your needs.

3

Build Better Bones

3D printing lets doctors quickly design and print implants custom-tailored to a patient's physiology. Earlier this year, U.S. surgeons replaced 75 percent of a patient's skull with an FDA-approved 3D-printed replica. Scientists claim that 3D printing produces a better-fitting implant than more traditional metal plates, and 3D-printed implants can also be etched with surface or edge details that encourage cell growth and allow bone tissue to attach and heal more easily.

4

Not Just Plastic

Most consumer-grade 3D printers can print only plastic. Industrial-grade 3D printers are more versatile; the Objet Connex printers, for example, can print objects made of up to 14 different materials. The result: objects with flexible joints, or even a translucent rubbery hand over a rigid skeletal structure. Multi-material printers are still too expensive for home use, but in the near future, medical offices might print out models of patients' bones sourced from their X-rays.

5

No Printer Required

As cool as 3D printing is, picking up an actual 3D printer for home use is still a pretty expensive investment. If you have an idea for a new object but don't have the time or money to sink into 3D printing as a hobby, you can upload your model to a 3D printing service such as Shapeways or Sculpteo and pay them to print and ship it to you. You'll still need to learn how to design a 3D model, but most 3D printing services offer tutorials and examples on their websites to help you get started. ●



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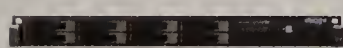
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